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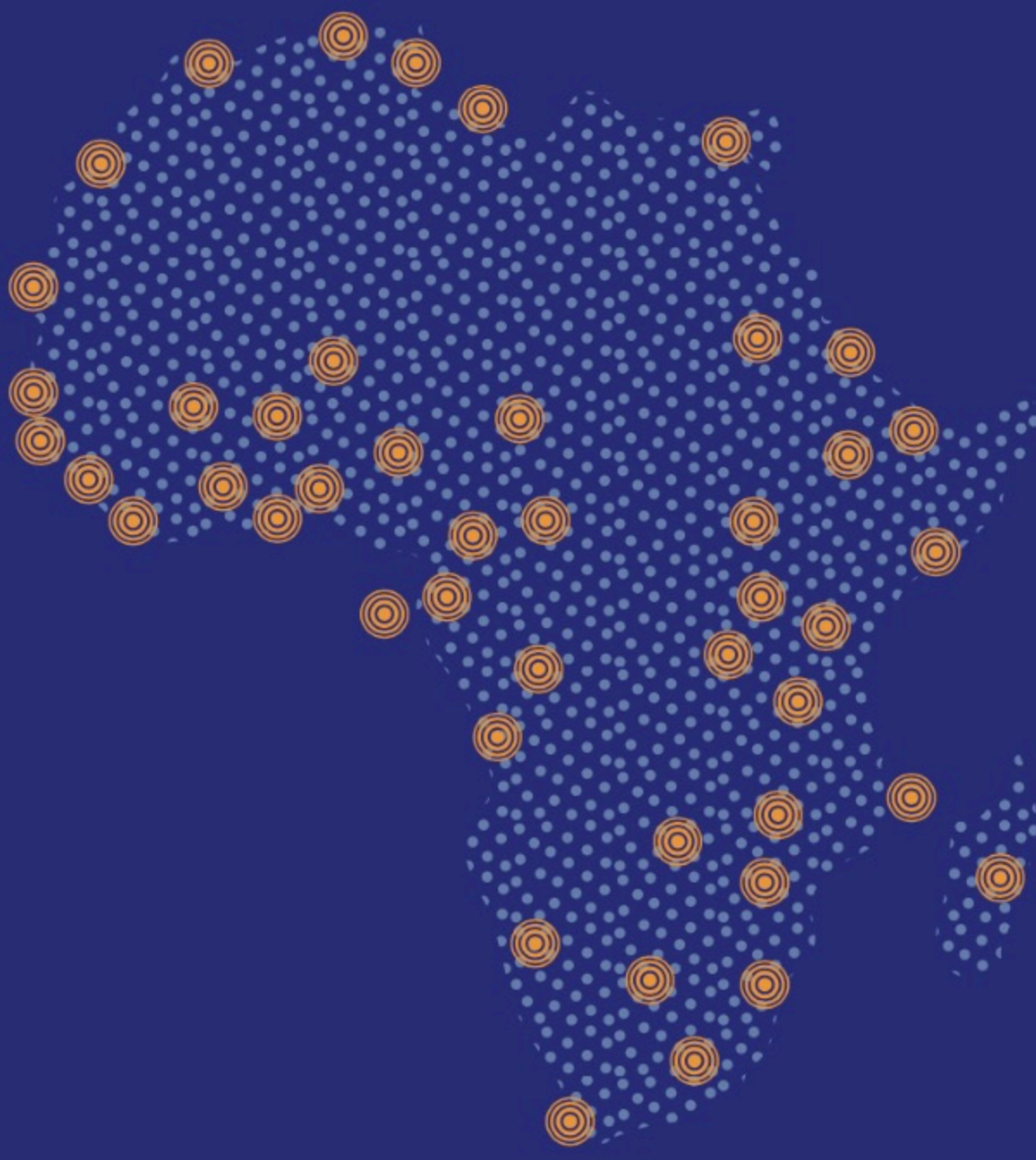

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Editorial for JARER Vol. 10 Issue 2, 2025

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Welcome to Volume 10 (2025), Issue 2 of the Journal of African Real Estate Research (JARER). This issue is a milestone in the life of JARER as it marks a decade of continuous and consistent publication of the journal issues. This is a period during which the journal was approved to be listed in the Directory of Open Access Journals (DOAJ) in January, 2023. This is in addition to being recognised as meeting acceptable quality and listed in the 2021 American Real Estate Society's (ARES) Real Estate Journal List. The list can be found at: https://www.aresnet.org/page/journal-list. During this period, we also had a special issue on women in African real estate and urban development research in 2021. We are aware that our modest achievements in the past decade could not have been possible without the efforts and support of the journal editorial board members (past and present), our anonymous reviewers and other stakeholders. Our gratitude therefore goes to them and all other stakeholders, including the past Editors-in-Chief (Prof. Samuel Azasu and Dr Felician Komu), the African Real Estate Society's board members, the team and colleagues at the library services at the University of Cape Town, our Special Issue Co-editors (Karen M. Gibler and Geci Karuri-Sebina), the past Journal Managers (Luke Boyle and Lesedi Kgaka) and the present Manager, Ms Dayni Sanderson. We will continue to appreciate the support from Prof. Karl-Werner Schulte and his team from the IREBS at Regensburg University, the IRES, and ERES, including the Urban Real Estate Research Unit at the University of Cape Town.

The Journal's qualities of review and thoroughness, no doubt, have improved tremendously, even though this has increased the rate of paper rejection in the recent past. The current issue contains seven papers with a focus on real estate students' entrepreneurial intentions, real estate development history and its implications for real estate research in Africa, spatial pattern of residential land prices, pre-letting and pre-sale arrangements in real estate development finance, residential real estate market characteristics and mortgage origination, among other themes.

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Ayodele, Ekemode and Mohammed's paper, using the theory of planned behaviour, examines the factors affecting the entrepreneurial intentions of real estate students and the relationship between the perceived motivators and demotivators, and demographic factors on real estate students' entrepreneurial intentions. The study's findings highlight the importance of market environment, mentoring, and familial support systems in fostering the venture creation potential of real estate students. Subjective norms, shaped by familial support, mentorship, and socio-cultural barriers, underscore the influence of demographics on students' intentions. The results show that financial, regulatory, and market challenges may impact perceived control, diminishing students' confidence despite high entrepreneurial intentions.

In a similar vein, Peiser and Fateye highlight forty years of real estate development history with a view to providing insights into the most important research topics in African real estate. Based on interviews with prominent African real estate professors and analysis of literature, the major topics fall into the following buckets: housing, finance, discrimination, data, sustainability, infrastructure, land reform, and digitisation. The conclusions highlight the most important real estate issues facing African urban and real estate development, including all aspects of real estate that influence development, namely, the institutionalisation of the industry both with respect to individual developers and finance companies; the evolution of mortgage markets, including secondary markets and public investment vehicles; among other issues.

Marandu, Tarimo and Mushi's paper analyses the spatial pattern of residential land prices in Dar es Salaam City, Tanzania. The paper applies spatial statistics to analyse the spatial auto correlation of residential land prices (RLPs) with a view to understanding their spatial distribution and variation. Global indicators of spatial association (GISA) and Local Indicators of Spatial Association (LISA) were utilised. This paper provides evidence-based insights for urban planning, policies, infrastructure development, and investor decisions, highlighting the importance of spatial statistics at the regional and sub-regional levels in understanding and improving urban dynamics and land market efficiency.

The role of pre-letting and pre-sale financing (PPF) arrangements in housing development forms the focus of the paper by Olayiwola, Aluko and Ayodele. The paper specifically examines the adoption level of PPF concepts among property development companies (PDC) in Lagos, Nigeria. Findings revealed that the proportion of pre-letting against the total units of property developed during the year under review was 7.48%, and pre-sale 17.44%. The study concludes on the need for PDC to pay more attention to pre-letting financing arrangements while also increasing the adoption of both arrangements to improve housing provision.

Boadu, Boakye, Anokye and Ansong's paper dwells on the socio-demographic factors that influence homeowners' choices of truss materials with a view to providing information for sustainable housing policy and market development. Data were obtained from 300 homeowners purposively selected across two major urban cities (Kumasi and Accra) in Ghana. The results show that women, unmarried individuals, and lower-income and less educated homeowners are more likely to select wood for truss construction. Whereas, homeowners who received third-party advice and have higher levels of education and earnings above US$200 had greater odds of selecting metal trusses. The paper concludes that socio-demographic micro-level considerations play a notable role in shaping timber-to-metal transitions by private residential builders.

Akinsomi and his co-authors analyse the relationship between mortgage origination and residential real estate property characteristics in Ghana. Using 1476 transaction-based data on

mortgages from 2008 to 2016, the paper applies a hedonic pricing model and multivariate regression to establish the role of structural property characteristics and residential real estate sub-markets in determining mortgage origination, separated into loan amount and loan-to-value (LTV) ratio. Further, the risk of default in the mortgages is estimated as an additional risk assessment tool for lenders. The findings, among others, reveal that residential sub-markets are important variables to consider when mortgages are originated in Ghana. Also, the paper finds that the risk of default by mortgage borrowers is negligible, indicating that lenders can safely expand their customer base.

In the final paper, Issah *et. al* explores the housing pathways and difficulties experienced by young graduates in attaining residential independence in Accra, Ghana. Questionnaires and interviews were used to collect data from 150 young graduates. The study revealed that young graduates in Accra faced significant challenges in their housing journeys, marked by frequent moves, unmet expectations, and limited affordable housing options. While many hoped for a quick shift to independent living, financial constraints, job relocation, and the realities of the housing market often delayed or complicated this process. The paper concludes that the young graduates were dissatisfied with the existing housing policies and calls for more affordable housing and rent control measures, among other policies.

Thank you for your continued interest in JARER. We look forward to receiving your feedback on this and previous issues of the journal.

Prof. Abel Olaleye

Editor-in-Chief

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How Demographics and Perceived Motivators Shape Real Estate Students' Entrepreneurial Intentions: A Theory of Planned Behaviour Analysis in an Emerging Market

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Abstract

In most emerging economies, students' perception that entrepreneurship is desirable and feasible is often reinforced by the difficulty in securing paid employment. However, the realities emanating from the motivators and demotivators and demographic influences usually influence students' entrepreneurial decisions. With a focus on Nigeria, this study examined the factors affecting the entrepreneurial intentions of real estate students and the relationship between the perceived motivators and demotivators, and demographic factors on real estate students' entrepreneurial intentions in an emerging market. The study adopted a total enumeration of all final-year real estate students in three purposively selected federal universities in Southwest Nigeria. Closed-ended questionnaires were distributed to all 231 final-year real estate students in the three institutions, and 160 questionnaires, representing 69.26% were retrieved and analysed. Data on students' intention and preference for real estate business, and the motivators and demotivators were collected on a five-point Likert scale and analysed using frequencies, percentages, RII, factor analysis, correlation analysis, and multivariate analysis of variance (MANOVA). Despite the students' high intention for real

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estate business data-driven aspects of the profession, such as feasibility and viability appraisal, valuation, and market analysis/data management, were the least preferred. While the motivators include financial freedom/flexibility, personal preference/fulfilment, economic factors, and prestige/status, lack of support system/market environment, the demotivators include finance, registration/information barriers, and risk perception/socio-cultural barriers. These had statistically significant relationships with demographic factors such as gender, family status, fathers' educational background, and occupation. This article highlighted the importance of market environment, mentoring, and familial support systems in fostering the venture creation potential of real estate students. Subjective norms, shaped by familial support, mentorship, and socio-cultural barriers, underscore the influence of demographics on students' intention. The results showed that financial, regulatory, and market challenges may impact perceived control, diminishing students' confidence despite high entrepreneurial intentions.

Keywords: *real estate business, demographic factors, real estate students, venture creation, Nigeria, TPB*

1. Introduction

There has been increased attention to entrepreneurship education and pathways among university students (Mwasalwiba, 2010). Entrepreneurship is crucial to economic growth, particularly in developing countries, because it fosters venture creation and enhances resilience (Singh et al., 2021). Globally, governments are increasingly promoting commercialisation and knowledge transfer, with an emphasis on entrepreneurship among university students (Maziriri et al., 2024). Entrepreneurship education encourages creativity, innovation, and national competitiveness in dynamic global market environments (Boldureanu et al., 2020). Accordingly, entrepreneurship modules are being integrated across various academic disciplines (Maziriri et al., 2024), especially in emerging markets, where governments are prioritising entrepreneurship training in science, technology, engineering, and mathematics (STEM) (Bomani et al., 2021). In the context of growing job market competitiveness, equipping graduates with entrepreneurial skills becomes vital (Eugene et al., 2013), while the scarcity of job opportunities further highlights the need to promote entrepreneurship (Frazao et al., 2010).

The construction industry contributes an average of about 8% to 10% to the economy of different countries (Opoku et al., 2021), and the real estate sector is a major driver in the industry. Given the professional nature of the discipline, the real estate sector is innately entrepreneurial (Ayodele et al., 2021). Real estate discipline is a professional career pathway with high tendencies for entrepreneurial activities. It presents students with opportunities to be self-employed or pursue white-collar employment. Real estate graduates have undergone core modules in asset valuation and appraisal, investment finance, and asset management, thus equipping them with entrepreneurial skills to create jobs and services in the built environment.

While the goal of entrepreneurial training is to cultivate students' intentions, understanding the factors that motivate students towards entrepreneurship, and providing essential support for their entrepreneurial pathways (Liñán, 2004; Ayodele et al., 2021), as well as understanding the dynamics that impact students' entrepreneurship intention and success, becomes important, especially demographic factors. Beyond the intention and passion, how prepared are the graduates for the challenges that entrepreneurship poses? Maziriri et al. (2024) posited that students who perceive the feasibility of launching entrepreneurial ventures are more likely to develop positive attitudes toward entrepreneurial careers. Additionally, it appears that

perseverance motivates students to pursue entrepreneurship. In this regard, Van Gelderen et al. (2008) noted that students with high levels of perseverance are more inclined to express entrepreneurial intentions. Thus, understanding the motivators and challenges towards a successful entrepreneurial pathway becomes important. Beyond the gradual shift in the focus of academic institutions towards entrepreneurial education, the students' perception of the gains and challenges of a successful entrepreneurial venture could inhibit their interest, especially when viewed from their demographic background.

Extant studies (Millman et al., 2010; Farrington et al., 2012; Ghazali et al., 2013; Ramos et al., 2020; Wen et al., 2024) have yielded mixed outcomes regarding the influence of demographic variables on students' entrepreneurial intentions. While previous studies have explored personal and environmental determinants of entrepreneurial intentions, including personality traits, attitudes, and social environments (Schwarz et al., 2006; Raposo et al., 2008), these studies have been generic without a focus on the challenges and motivators vis-à-vis the influence of demographic variables on students' entrepreneurial intentions. Thus, there is still a dearth of studies, especially in emerging economies like Nigeria, confronted with a worrisome level of graduate unemployment estimated at around 40.1% (Nigerian Economic Summit Group, 2024). This study examined the motivations, challenges, and demographic variables that significantly influence students' entrepreneurial intentions within a non-core science discipline like real estate.

Towards this end, the study examined the intentions and preferences of students regarding the real estate business; analysed the motivators and obstacles influencing students' entrepreneurial intentions; and evaluated the relationship between students' demographic variables, the influencing factors, and their entrepreneurial intentions.

2. Literature review

The literature review section comprises three broad sections. The first section discussed Ajzen's (1991) Theory of Planned Behaviour as the theoretical underpinnings of the study, and the second section examined the relationship between entrepreneurial education and students' intention. The third focused on the review of extant studies considering the influence of demographic factors and the factors motivating or demotivating students' entrepreneurial intentions.

2.1 Theoretical foundation

Ajzen's (1991) Theory of Planned Behaviour (TPB) provides a foundational background in understanding the cognitive processes that translate attitudes and beliefs into actions. Entrepreneurial intention is seen as an individual's conscious commitment to starting a business venture at a future date (Thompson, 2009). It represents a mental state directing actions toward self-employment, rather than seeking corporate roles (Uygun and Kasimoglu, 2013). According to the TPB, intentions are critical predictors of behaviour, suggesting a deeper understanding of how entrepreneurial intentions can lead to the venture creation process (Galanakis and Giourka, 2017). The TPB suggests that intentions predict behaviour, thus facilitating action forecasting (Ajzen and Kruglanski, 2019). Nabi et al. (2010) highlighted the reliability of Ajzen's TPB in predicting behaviour and its ability to indicate entrepreneurial intentions. Thus, the TPB emphasises that entrepreneurial intentions are shaped by perceived attitudes toward a new venture, perceived social norms, and control beliefs.

Entrepreneurial intention is a strong predictor of entrepreneurial potential, reflecting an individual's belief in starting a new venture (Thompson, 2009). Liñán and Rodríguez-Cohard (2015) assert that entrepreneurial intentions significantly predict start-up behaviour among undergraduate students. Engagement with successful entrepreneurs and mentors enhances students' entrepreneurial intentions by building confidence and providing guidance (Taneja, 2022). In Nigeria, employment prospects for university graduates have been on the decline, leading many graduates to develop intentions for entrepreneurship (Salau and Akanbi, 2021).

While research has consistently emphasised the need for entrepreneurship education to align with labour market demands, promoting self-employment and innovation as viable career pathways for graduates (Killingberg et al., 2021), research on real estate students remains limited. Real estate education provides a solid foundation for students interested in entrepreneurship by offering critical skills applicable in diverse contexts such as property agency, marketing, management, and property development.

2.2 Entrepreneurial education and real estate students

Various factors, including entrepreneurship education and training (Nabi et al., 2017; Puni et al., 2018), influence entrepreneurial intentions. Entrepreneurship education is crucial for equipping students with the skills needed to develop and launch businesses. It fosters the ability to identify business opportunities, manage finances, and develop innovative thinking (Martins et al., 2022). Su et al. (2021) highlighted the importance of assessing university support services, which facilitate the transformation of ideas into businesses (Colombo and Piva, 2020). A supportive university environment enhances entrepreneurial awareness and motivation, particularly during the early stages of the entrepreneurial process (Li and Horta, 2021).

Thus, universities are critical in fostering entrepreneurial knowledge (Ayodele et al., 2021), especially in developing economies like Nigeria. The supportive services they provide are an essential component of entrepreneurship development. However, beyond these services, universities must implement tailored curricula that promote entrepreneurial thinking and provide experiential learning opportunities to facilitate the transition from theory to practice (Bauman and Lucy, 2021). Oladokun (2012) and Egwuatu (2013) have emphasised the need for curricular reform to incorporate specialised entrepreneurial knowledge. To prepare students for entrepreneurship and contributing to national economic development, real estate education must align students' interests towards the entrepreneurial opportunities within the discipline and offer training that aligns with current market realities.

2.3 Review of extant studies

i. Influence of demographic factors

The influence of demographic factors on students' entrepreneurial intentions has produced mixed results. For instance, Ghazali et al. (2013) and Wen et al. (2024) underscored the impact of gender-based differences on entrepreneurial intentions, with females exhibiting higher attitudes and social skills towards entrepreneurship compared to male students. Chang et al. (2023) found that women are more likely to engage in necessity entrepreneurship, whereas men tend to pursue opportunity-driven entrepreneurship. Conversely, Farrington et al. (2012) argued that males are more susceptible to entrepreneurial intentions than their female

counterparts. The relationship between entrepreneurial intentions and age has also generated varied outcomes. Chang et al. (2023) observed that there is an inverted U-shaped relationship between age and entrepreneurial intentions, indicating that entrepreneurial activity varies with age. In contrast, Vasumathi et al. (2023) reported a linear relationship between entrepreneurial activity and age, particularly among individuals who prefer self-employment. Similarly, Pérez-Macías et al. (2022) noted that for those who are compelled into entrepreneurship by the unavailability of white-collar jobs, age has a significantly smaller effect on their entrepreneurial behaviour.

Millman et al. (2010) underscored the importance of household income and student status in shaping students' entrepreneurial intentions. Chang et al. (2023) submitted that the probability of necessity entrepreneurship is lowered by education and higher income, whereas opportunity entrepreneurship is motivated by higher income. While Tarapuez-Chamorro et al. (2018) noted that having entrepreneurial friends increases the likelihood of entrepreneurial intention, Pérez-Macías et al. (2022) argued that cultural and social contexts influenced entrepreneurial intentions, along with informal institutions. Several studies affirmed the impact of ethnicity, the university attended and level of study (Farrington et al., 2012), prior work experience (Wen et al., 2024), and educational background (Millman et al., 2010; Ramos et al., 2020) on students' entrepreneurial intentions. Ghazali et al. (2013) reported that age, race, and parental background may not have a substantial impact. Other factors such as nationality, family business experience, region, and specialisation have also been found to have a positive effect on entrepreneurial intention (Uike, 2019). Finally, while Mohan (2022) found that entrepreneurial education significantly affects the intentions of students to become entrepreneurs, Barral et al. (2018) found no significant effect.

ii. Motivators and demotivators of students' entrepreneurial intentions

An array of factors influences students' entrepreneurial intentions. Singh et al. (2021) identified that access to capital, information, and social networks plays a critical role. While education provides the necessary information and networks for business growth, limited access to financial resources remains a significant systemic barrier, especially for students in developing economies (Pand and Dash, 2014). This challenge is also amplified by poorly developed financial markets. Developing countries often suffer from weak institutional frameworks, excessive bureaucracy, a lack of supportive policies, and market distortions that hinder entrepreneurial initiatives (Virgill, 2008). Poor infrastructure, such as inadequate transportation, logistics, and communication networks, further complicates the entrepreneurial landscape. These limitations make it difficult for students to scale their businesses and access broader markets (Panda and Dash, 2014). In some cases, a lack of social support - including family and societal expectations - and negative subjective norms can be significant barriers (Pinazo-Dallenbach and Castelló-Sirvent, 2024). Gender disparities also affect entrepreneurial intentions, with women often facing more significant challenges due to societal norms and expectations (Pinazo-Dallenbach and Castelló-Sirvent, 2024). Psychological barriers in the form of risk aversion and fear of failure also significantly impact students' willingness to pursue entrepreneurial ventures (Molou, 2024).

The absence of comprehensive entrepreneurial education and support systems in universities is another significant barrier (Molou, 2024; Bahrami et al., 2023). Bahrami et al. (2023) also identified a mismatch between the skills taught in universities and those required for successful entrepreneurship, leading to lower entrepreneurial intentions. Parental influence plays a key role in shaping these intentions (Mahmoud et al., 2022; Wu et al., 2022). Marketing skills, a

desire to succeed, leadership skills, and innovation and creativity are additional motivators influencing students' entrepreneurial pursuits (Ghazali et al., 2013). The quest for independence and self-development, the need to apply one's knowledge, and the search for financial security were also identified as major factors influencing students' entrepreneurial intentions (Van Gelderen et al., 2008). Sisu et al. (2024) noted that business incubation programmes, mentoring services, innovation labs for business idea validation, and networking events as factors that enhance students' interest in entrepreneurial pathways.

In summary, while the TPB asserts that entrepreneurial intentions strongly influence students' entrepreneurial behaviour, the support services and entrepreneurship education afforded by institutions of higher learning play a pivotal role in shaping these intentions by creating awareness and presenting entrepreneurship as a viable career pathway. In most emerging economies, students' perception that entrepreneurship is both desirable and feasible is often reinforced by the difficulty in securing paid employment. Most students believe they possess entrepreneurial skills, viewing entrepreneurship as an alternative option and focusing solely on the perceived benefits. However, the realities emanating from the challenges and demographic influences could inhibit the pursuit of students' entrepreneurial intentions. In this study, we posit that the perceived benefits, barriers, and demographic factors exert a significant impact on real estate students' entrepreneurial intentions in an emerging market like Nigeria.

3. Data and methods

A cross-sectional survey approach was adopted. The study population comprises final year real estate students in three purposively selected universities in Southwest Nigeria. These universities – Obafemi Awolowo University, Ile-Ife, University of Lagos, based in Lagos, and the Federal University of Technology located in Akure – are first-tier institutions offering full-time Bachelor's degree real estate programmes in Nigeria's Southwestern geo-political zone. More so, these universities have the highest student enrolment studying estate management relative to other universities in the region. The selection of final year students is premised on the fact that they have gone through a substantial part of their academic training, and they are expected to have some basic knowledge of the entrepreneurial opportunities in the profession. In addition, they have just completed their Students' Industrial Work Experience Scheme.

The study employed a total enumeration of all 231 final-year real estate students in the three institutions. A total of 66, 76, and 89 final-year students were surveyed at the Obafemi Awolowo University, Ile-Ife, the University of Lagos, and the Federal University of Technology, respectively. Primary data were obtained using closed-ended questionnaires. The data focused on students' demographic profiles, intention and preference for real estate business, and the motivators and demotivators to their entrepreneurial option. In measuring the level of influence of the factors, a five-point Likert scale was used: 1 *(not influential) to* 5 *(very influential)*.

From a total of 231 questionnaires distributed, 160 questionnaires, representing 69.26%, were retrieved and analysed. Frequencies, percentages, mean score, one-sample t-test, factor analysis, correlation analysis, and multivariate analysis of variance (MANOVA) were employed to analyse the data. For the one-sample t-test, the study adopted a test value of 3.0, being the mean value of the sum of the 5-point scale. Statistical significance was set at $p \leq 0.05$. Using Varimax rotation with Kaiser Normalisation, exploratory Principal Component Analysis (PCA) was utilised to decompose the motivators and inhibitors of students'

entrepreneurial intentions. The PCA was conducted subject to acceptable levels of Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity. Studies such as Field (2005) have identified KMO values exceeding 0.700 with a significant Bartlett's test of sphericity value below 0.000 as suitable for factor analysis. A loading cut-off rate of 0.5 (50%) with a variance overlap of 30% was employed in undertaking the PCA.

4. Findings and discussions

The findings of the study are presented based on the study's objectives. While the first and second sections present the demographic profile of the respondents and the intentions and preferences of students regarding real estate business, the third section focuses on the motivators and obstacles influencing students' entrepreneurial intentions. The relationship between students' demographic variables, the influencing factors, and their entrepreneurial intentions was assessed in the fourth section.

Demographic profile of respondents

Table 1 shows the respondents' profile. From the result, 76.9% of the students were in the 21 to 25 years age bracket, with only 1.9% being 31 years and above. While 58.1% were males, 41.9% were females. The analysis also showed that 95.0% of the students were single, and 4.4% were married. The result of the parents' level of education showed that 1.9% of fathers and 3.8% of mothers had no formal education. A greater percentage of the fathers (61.2%) had at least a first degree when compared with 41.9% of mothers. Mahmoud et al. (2022) and Wu et al. (2022) have suggested that parental occupation could serve as an impetus motivating students' preferences for either paid jobs or entrepreneurship. The occupation of the parents showed that 51.3% of both fathers and mothers were self-employed/business persons, with 29.4% and 37.6% of the fathers and mothers, respectively, being employees of private or public firms. Given the importance of finance and family support, the study evaluated the family status of the respondents. The result shows that only 6.3% of the students were from high-income families. This could significantly influence the entrepreneurial career pathway of the students, especially concerning raising startup funds/capital. Regarding the mode of admission, the results show that those admitted through the University Matriculation Examinations accounted for 71.2%, and 27.5% were admitted through Direct Entry after they had obtained a diploma certificate in a built environment discipline. It might be expected that students admitted through the University Matriculation Examinations who are unable to secure admission into their preferred course of study may be reluctant to pursue entrepreneurship opportunities in real estate. However, students admitted through Direct Entry are often more interested in the discipline and may be more receptive to the possibilities of entrepreneurship.

Table 1: Demographic profile of respondents

Demographics		Frequency (n = 160)	Percentage (100%)
Age	20 years and below	4	2.5%
	21 to 25 years	123	76.9%
	26 to 30 years	30	18.8%
	31 years and above	3	1.9%
Gender	Male	93	58.1%
	Female	67	41.9%
Marital status	Single	152	95.0%
	Married	7	4.4%
	No response	1	0.6%
Father's educational background	No formal education	3	1.9%
	Primary school	17	10.6%
	High school	11	6.9%
	Vocational/technical college	17	10.6%
	National certificate examination/National diploma	12	7.5%
	Higher National Diploma/Bachelor of Science	73	45.6%
	Masters/Doctor of Philosophy	25	15.6%
	No response	2	1.3%
Mother's educational background	No formal education	6	3.8%
	Primary school	24	15.0%
	High school	17	10.6%
	Vocational/technical college	10	6.3%
	National certificate examination/National diploma	35	21.9%
	Higher National Diploma/Bachelor of Science	59	36.9%
	Masters/Doctor of Philosophy	8	5.0%
	No response	1	0.6%
Father's occupation	Business/Self-employed	82	51.3%
	Public/Private sector employee	47	29.4%
	Retired	27	16.9%
	No response	4	2.5%
Mother's occupation	Business/Self-employed	82	51.3%
	Public/Private sector employee	60	37.9%
	Retired	16	10.0%
	No response	2	1.3%
Family status	Low income	10	6.3%
	Middle income	136	85.0%
	High income	10	6.3%
	No response	4	2.5%
Mode of admission	Direct Entry (DE)	44	27.5%
	University Matriculation Examinations	114	71.2%
	No response	2	1.3%

Intentions and preferences for the real estate business

The results also assessed students' intention concerning real estate venture creation (Table 2). This had a mean score of 3.82 (SD. 0.957), indicating a high intention for real estate entrepreneurship. This result might be influenced by the increasing economic opportunities and new frontiers in Protech, fintech, and increasing demands for short-let apartments in emerging markets such as Nigeria. The one-sample t-test showed that the mean values have a positive mean difference, with statistical significance at $p < 0.05$.

Table 2: Preference for real estate business venture

			One-sample t-test (Test Value = 3.0)		
Preference for real estate business	**Mean**	**S.D**	**t**	**p-value**	**Mean diff.**
Intentions for real estate enterprise	3.82	0.957	10.817	0.000*	0.819
Real estate entrepreneurial options					
Property development	3.91	1.128	8.309	0.000*	0.914
Property management/Real estate agency	3.91	1.272	7.366	0.000*	0.914
Facility management	3.64	1.145	5.647	0.000*	0.644
Feasibility and viability appraisal	3.43	1.298	3.400	0.001*	0.433
Valuation	3.41	1.304	3.233	0.002*	0.413
Market analysis/Data management	3.09	1.116	0.719	0.431	0.087

**p-value significant at 0.05*

The study also explored the respondents' preferences for the different aspects of real estate enterprise. The results (Table 2) revealed that property development (*mean* = 3.91) and property management/estate agency (*mean* = 3.91) were the most preferred options. The result further revealed a somewhat high level of preference for facility management (*mean* = 3.64). The least preferred options are feasibility and viability appraisal (*mean* = 3.43), valuation (*mean* = 3.41), and market analysis/data management (*mean* = 3.09). The result suggests that the data-driven aspects of the real estate profession, such as feasibility and viability appraisal, valuation, and market analysis/data management, were the least preferred options. Given the increasing integration and adoption of technology, along with the ongoing digitalisation drive in the built environment, developments in Proptech and Fintech are becoming major market directions. These developments are underpinned by real-time market data and data analytics. The analysis of statistical differences revealed a positive mean difference for all the options, and the *p*-values were significant at $p < 0.05$, except for market analysis/data management, with a *p*-value of 0.431.

Assessment of motivators and demotivators to students' entrepreneurial intentions

The study further examined students' perceptions of the motivators and likely challenges influencing their entrepreneurial intentions. This was analysed using the principal component analysis (PCA). The PCA was used to summarise the data into a few clusters of original variables, thereby easily identifying underlying correlations. Initial analysis of the motivating and inhibiting factors revealed that the factors satisfy the criteria for factorability, with a KMO of 0.907 and 0.868 for the motivators and obstacles, respectively. These are significant at $p \leq 0.05$. The results of the variances for the motivators (Table 3) revealed a four-factor solution explaining a total of 61.316% of the variance. The first factor, financial freedom/flexibility, accounted for 21.542% of the total variance. The second factor, personal preference/fulfilment, contributed 19.379% of the total variance. The third factor, economic factors, accounted for 15.073%, while the fourth factor was prestige/status of 5.322% of the total variance. Regarding the perceived challenges, four factors explaining 63.667% of the total variance were extracted (Table 3). The first factor, support system/market environment, accounted for 22.226% of the total variance. The second factor relates to finance, which explained 15.235% of the total variance. While the third factor, registration/information barriers, contributed 13.609% of the total variance, and the fourth factor, risk perception/socio-cultural, accounted for 12.597% of the total variance.

Table 3: Total variance explained for motivators and inhibiting factors

	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Motivating factors									
1	12.433	46.048	46.048	12.433	46.048	46.048	5.816	21.542	21.542
2	1.557	5.766	51.813	1.557	5.766	51.813	5.232	19.379	40.921
3	1.434	5.309	57.122	1.434	5.309	57.122	4.070	15.073	55.993
4	1.132	4.193	61.316	1.132	4.193	61.316	1.437	5.322	61.316
Inhibiting factors									
1	8.271	41.357	41.357	8.271	41.357	41.357	4.445	22.226	22.226
2	2.073	10.365	51.721	2.073	10.365	51.721	3.047	15.235	37.460
3	1.300	6.500	58.221	1.300	6.500	58.221	2.722	13.609	51.070
4	1.089	5.446	63.667	1.089	5.446	63.667	2.519	12.597	63.667

Extraction method: Principal Component Analysis

Table 4 shows the factor loadings for the four factors, their percentage variance, the RII, and the importance level of the components. From the RII, the results suggest that the motivators

with the highest level of influence on the students' entrepreneurial intentions are the desire to be one's own boss (*RII* = 0.812) and financial motivations: acquiring financial freedom (*RII* = 0.806) and attaining higher income (*RII* = 0.802). However, other core real estate issues had a high to medium level of influence, as shown by the RII.

Table 4: Rotated component matrix for the motivating and demotivating factors

Components	Loadings	% of Variance	Cronbach alpha	RII	Importance level
Motivators					
Financial freedom/flexibility		21.542	0.909		
Financial freedom and independence	0.738			0.806	H
Possibility of attaining a higher income	0.731			0.802	H
Desire for personal freedom/flexible working time	0.712			0.786	H-M
To be my own boss	0.670			0.812	H
Good economic environment	0.632			0.738	H-M
To challenge myself	0.570			0.778	H-M
Ability to choose own work task	0.558			0.782	H-M
To realise my dream	0.557			0.790	H-M
Personal preference/fulfilment		19.379	0.868		
Preference for varied and non-repetitive tasks	0.767			0.738	H-M
Ability to measure the direct output of investments	0.651			0.740	H-M
I enjoy motivating others	0.650			0.762	H-M
Desire to follow the example of my role model(s)	0.625			0.648	H-M
Helping others fulfil their dreams/desires regarding housing/shelter	0.624			0.732	H-M
Personal fulfilment	0.591			0.770	H-M
Economic factors		15.073	0.883		
To provide employment	0.763			0.752	H-M
To take advantage of opportunities in the market	0.727			0.786	H-M
To have job security	0.688			0.784	H-M
To provide support for younger real estate entrepreneurs	0.609			0.732	H-M
To take advantage of my innate business talent	0.554			0.760	H-M
Prestige/family culture		5.322	0.722		
Increase my prestige and status	0.861			0.786	H-M
To sustain the entrepreneurial family culture	0.502			0.734	H-M
Demotivators					
Support system/market environment		22.226	0.875		
Difficulty in convincing others about real estate business ideas	0.806			0.620	H-M
Lack of support from real estate business mentors to start a real estate business	0.759			0.594	M
Lack of support from family and/or friends	0.691			0.556	M
Difficult to find the right partners to start a real estate business	0.648			0.650	H-M
The risks in real estate practice far outweigh the benefits	0.608			0.606	H-M
Uncertainty about the local market	0.606			0.654	H-M
Finance		15.235	0.837		
Lack of assets for collateral	0.858			0.742	H-M
Difficulty in obtaining finance for a start-up	0.851			0.754	H-M
Lack of personal savings	0.763			0.676	H-M
Registration/information barriers		13.609	0.718		
High cost of business registration	0.817			0.682	H-M
Lack of information about the government agency that the real estate business	0.602			0.670	H-M
Rigorous registration process with the professional bodies	0.593			0.698	H-M
Risk perception/socio-cultural barriers		12.597	0.820		
The risk involved does not match the time and effort	0.853			0.652	H-M
Cultural barriers to starting a real estate business	0.838			0.664	H-M
Perceived discrimination against female entrepreneurs	0.596			0.652	H-M

Extraction method: Principal Component Analysis
Rotation method: Varimax with Normalisation.
H–M = high-medium, H = high

An analysis of the demotivators impacting entrepreneurial intentions (Table 4) showed that the highly rated demotivators include difficulty in obtaining startup finance (*RII* = 0.754), lack of collateral assets (*RII* = 0.742), and difficulty in registering with professional bodies (*RII* = 0.698). The mean ratings underscore the importance of startup finance and collateral requirements. Overall, this reveals the main challenges influencing business ventures in most emerging markets. The statistical analysis shows that while two of the factors (support from a mentor and support from family and friends) had negative mean differences, most of the factors had statistically significant differences at $p < 0.05$.

The influence of factors relating to financial freedom supports the findings of Pruett et al. (2009). The findings revealed that the motivator, financial freedom/flexibility, accounted for the highest percentage of variance, indicating the greatest influence on students' entrepreneurial intentions. Others, in order of influence, are personal preference/fulfilment, economic factors, and prestige/family culture.

The variable loading of each component for the demotivators is presented in Table 4. The result of the challenges to students' entrepreneurial intentions corroborates the findings of Pruett et al. (2009). An examination of the variances showed that the support system/market environment, accounting for 22.226% of the total variance, was the key factor that could hinder students' entrepreneurial intentions. The second factor is finance, contributing 15.235% of the total variance. The two least factors are registration/information barriers and risk perception/socio-cultural barriers. These amounted to 13.609% and 12.597% of the total variances, respectively. The effects of socio-cultural barriers reflect the impact of sociocultural influences, usually in the form of stereotyping and gender discrimination.

Correlation analysis between entrepreneurial intent and influencing factors

The result of the correlation analysis between the students' entrepreneurial intentions and the influencing factors (Table 5) showed that the motivators were positively correlated with entrepreneurial intentions and were significant at $p < 0.05$. However, three of the challenges – finance, registration/information barriers, and risk perception/sociocultural barriers – were lowly correlated with entrepreneurial intentions, and the support system/market environment was negatively correlated with the students' entrepreneurial intentions. The findings showed a direct positive and significant relationship between the motivating factors and the students' entrepreneurial intentions. The predominantly low correlation between the demotivators suggested these factors do not significantly positively influence students' entrepreneurial intentions.

Table 5: Correlation between entrepreneurial intention and influencing factors

Factors	Entrepreneurial intention	Financial freedom/ flexibility	Personal preference/ fulfilment	Economic interest	Prestige/ status	Support system/ market environment	Finance	Registration / information barriers	Risk perception/ sociocultural barriers
Entrepreneurial intention	1								
Financial freedom/flexibility	0.291**	1							
Personal preference/fulfilment	0.309**	0.699**	1						
Economic interest	0.277**	0.687**	0.700**	1					
Prestige status	0.288**	0.627**	0.564**	0.496**	1				
Support system/market environment	-0.135	0.117	0.139	-0.037	0.089	1			
Finance	0.038	0.238**	0.404**	0.362**	0.206*	0.265**	1		
Registration/information barriers	0.047	0.218**	0.314**	0.185*	0.212**	0.603**	0.403**	1	
Risk perception/sociocultural barriers	0.038	0.011	0.077	-0.035	0.035	0.592**	0.225**	0.485**	1

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

Statistical significance between demographic and influencing factors

The study adopted the multivariate analysis of variance (MANOVA) to examine the statistical relationship between the demographics, entrepreneurial intentions, and the motivators and demotivators. An examination of the statistical relationship (Table 6) between the demographics and the students' entrepreneurial intentions showed that none of the demographic factors was statistically significant at $p < 0.05$. However, the mother's occupation was statistically significant with students' entrepreneurial intentions at the $p < 0.1$ level. The results negate the results of Israr and Saleem (2018), who found a statistically significant relationship between demographic factors such as family background, gender, education, and entrepreneurial intention.

Assessing the relationship between the demographic factors and the motivating factors showed no statistical significance between most of the pairs, except for gender, fathers' educational background, and family status. The result revealed a statistically significant relationship between gender and personal preference/fulfilment at $p = 0.044$, an adjusted alpha level of 0.020, and a partial eta squared of 0.026. An examination of the mean rating (Appendix A) showed that females have a higher personal preference for entrepreneurship than males. The females rated the factor more highly than their male counterparts, having a mean value of 3.84 and 3.57, respectively.

The result also indicated that the interaction between a father's educational background and prestige/status was significant at $p = 0.032$, with an adjusted alpha of 0.052, and a partial eta squared of 0.090. Appendix B shows the results of the mean scores. It revealed that students whose fathers held lower educational certificates – such as diploma certificates, high school certificates, and vocational/technical certificates – reported higher mean scores for prestige/status as a motivating factor, with scores of 4.18, 4.22, and 4.31, respectively. These scores were higher than those of students with fathers who had attained a higher educational qualification. At a 10% significance level, the results showed that the father's educational background had a statistically significant relationship with financial freedom/flexibility at $p = 0.089$.

The relationship between family status and economic interest was statistically significant at $p = 0.023$, with an adjusted alpha of 0.037, and a partial eta squared of 0.050. The mean rating, as shown in Appendix C, revealed that motivations based on economic interest were more highly rated by students from low and middle-income families. This had a mean score of 4.09 and 3.86, respectively.

Examining the statistical relationship between the demographic factors and the challenges to the students' entrepreneurial intentions, the findings (Table 6) showed that there are no statistically significant pairs. Though the interaction between risk perception/socio-cultural barriers and gender had a significant relationship at $p = 0.007$, with an adjusted alpha level of 0.041, and a partial eta squared of 0.047. The mean scores, as shown in Appendix D, reveal that risk perception/socio-cultural barriers are rated more highly by female students than by male students. This may be attributed to the fact that socio-cultural challenges are often more far-reaching for female entrepreneurs due to persistent gender stereotypes. This finding corroborates research from Goby and Erogul (2011), Mungeri and Ogot (2012), and Panda (2018), who affirmed the influence of discriminatory practices on female entrepreneurs.

Furthermore, the interaction between fathers' occupation and risk perception/socio-cultural barriers was statistically significant at p-value = 0.049, with an adjusted alpha level of 0.032, a partial eta squared of 0.051. The analysis of the mean scores (Appendix E) revealed that students whose fathers are self-employed/businessmen (3.46) and private sector employees (3.47) had higher mean ratings than students whose fathers were public sector employees (3.14) and retirees (2.85). In addition, the analysis revealed statistically significant relationships between the interaction between the mode of admission and support system/market environment had a significant relationship at $p = 0.02$, with an adjusted alpha of 0.029, and a partial eta squared of 0.035. The interaction between the mode of admission and risk perception/socio-cultural barriers had a significant relationship at $p = 0.000$, with an adjusted alpha of 0.077 and a partial eta squared of 0.083.

The analysis of the mean scores (Appendix F) revealed that respondents admitted through the direct entry (DE) rated these challenges more highly than respondents admitted through the matric exams. This might be due to their better understanding of the peculiar challenges in real estate business ventures, having undergone a mandatory one-year internship at a real estate firm.

Table 6: Multivariate analysis of variance between demographic factors and influencing factors

Factors		Entrepreneurial intentions	Financial freedom/ flexibility	Personal preference/ fulfilment	Economic interest	Prestige/ status	Support system/ market environment	Finance	Registration/ information barrier	Risk perception/ sociocultural barriers
Age	F	0.515	1.618	0.627	0.790	1.181	0.080	0.587	1.236	0.343
	Sig.	0.673	0.187	0.598	0.501	0.319	0.971	0.624	0.299	0.794
	Partial eta squared	0.010	0.031	0.012	0.016	0.023	0.002	0.011	0.024	0.007
Gender	F	0.314	0.452	4.135	1.319	0.156	1.789	0.202	0.368	7.557
	Sig.	0.576	0.502	**0.044***	0.253	0.693	0.183	0.653	0.545	**0.007***
	Partial eta squared	0.002	0.003	0.026	0.009	0.001	0.011	0.001	0.002	0.047
Marital Status	F	0.020	0.509	0.030	0.564	1.636	0.158	1.194	0.036	0.388
	Sig.	0.887	0.477	0.863	0.454	0.203	0.691	0.276	0.850	0.534
	Partial eta squared	0.000	0.003	0.000	0.004	0.011	0.001	0.008	0.000	0.003
Father's educational background	F	1.252	1.874	1.049	0.642	2.385	0.564	0.976	0.621	1.111
	Sig.	0.283	**0.089****	0.397	0.697	**0.032***	0.759	0.444	0.713	0.358
	Partial eta squared	0.049	0.072	0.042	0.026	0.090	0.022	0.038	0.025	0.043
Mother's educational background	F	1.646	0.424	0.486	0.631	1.353	0.487	0.474	0.416	1.754
	Sig.	0.138	0.862	0.818	0.705	0.237	0.817	0.827	0.868	0.112
	Partial eta squared	0.063	0.017	0.020	0.025	0.053	0.019	0.019	0.017	0.066
Father occupation	F	1.079	0.590	0.495	0.419	0.406	0.600	0.330	1.528	2.674
	Sig.	0.360	0.622	0.686	0.740	0.749	0.616	0.804	0.210	**0.049***
	Partial eta squared	0.021	0.012	0.010	0.009	0.008	0.012	0.007	0.030	0.051
Mother occupation	F	2.224	0.786	1.028	1.458	1.435	1.268	0.561	0.272	0.295
	Sig.	**0.088****	0.503	0.382	0.229	0.235	0.288	0.642	0.845	0.829
	Partial Eta Squared	0.043	0.016	0.020	0.029	0.028	0.025	0.011	0.005	0.006
Family status	F	1.517	0.552	0.977	3.866	0.205	1.697	0.026	0.250	1.017
	Sig.	0.223	0.577	0.379	**0.023***	0.815	0.187	0.975	0.780	0.364
	Partial eta squared	0.020	0.007	0.013	0.050	0.003	0.022	0.000	0.003	0.013
Mode of admission	F	2.496	0.585	0.201	0.011	0.252	5.515	0.039	2.138	3.719
	Sig.	0.116	0.445	0.655	0.918	0.617	**0.020***	0.843	0.146	**0.000***
	Partial eta squared	0.016	0.004	0.001	0.000	0.002	0.035	0.000	0.014	0.083

**p-value significant at 0.05, ** p-value significant at 0.10*

5. Conclusions

This study examined the factors influencing the entrepreneurial intentions of real estate students in Nigeria and the relationship between the perceived motivators and demotivators, and demographic factors on real estate students' entrepreneurial intentions in an emerging market. The findings showed that the intention for real estate entrepreneurship was high among the respondents, and the most preferred entrepreneurial option relates to property development, agency, property management, and facility management. This is possibly due to the respondents' limited understanding of emerging trends in the built environment; enterprise options related to market, data and data analytics were the least preferred options.

The results further showed that significant motivators driving the students' enterprise intentions relate to financial flexibility/freedom, personal fulfilment/preference, economic interest, and status/prestige. Conversely, factor relating to the system/market environment was an influential obstacle to students' enterprise intentions. Other inhibiting factors included finance, registration/information barriers, and risk perception/sociocultural barriers. While the correlation analysis showed significant correlations between motivators and entrepreneurial intentions, the results of the statistical analysis showed that none of the demographic variables were statistically significant with entrepreneurial intention. However, statistically significant relationships were found between gender and motivators relating to personal preference/fulfilment and barriers relating to risk perception/sociocultural factors. Another significant relationship was found between family status and economic interest, fathers' educational qualification and prestige/status, as well as between fathers' occupation and risk perception/sociocultural barriers.

Assessing the findings based on Ajzen's (1991) TPB framework, the results showed that students' high entrepreneurial intent in the real estate business reflected positive attitudes driven by motivators like financial freedom, personal fulfilment, and prestige. However, their aversion to data-driven tasks (e.g., feasibility analysis) suggested that attitudes toward specific aspects of the profession may be less favourable, potentially undermining their perceived behavioural control. Also, the influence of familial support systems, mentorship, and socio-cultural barriers relates to issues of subjective norms. While students' demographics serve as reinforcing factors, socio-cultural barriers suggest societal norms that may inhibit the students' entrepreneurial intentions, financial constraints, registration hurdles, and market environment challenges directly impact perceived behavioural control. These barriers reduce the confidence of the students in pursuing a real estate enterprise, despite their high level of intentions. The study's emphasis on mentoring and market support aligns with TPB's assertion that enhancing perceived control through resources or training can strengthen students' entrepreneurial intentions. The implications of the foregoing underscore the need for faculties in institutions of higher learning to expose and stimulate students' interest in emerging trends/business enterprises in the real estate sector. As noted by Ayodele et al. (2024), Fintech, Proptech, and Blockchain technology are emerging as central themes shaping the built environment. Fostering student entrepreneurship in these sectors represents a critical step toward driving innovation and addressing evolving industry challenges. Equally important is the role of support/market environment, which highlights the significance of mentoring and familial support. Where there is no active and thought-out mentoring of young real estate entrepreneurs by well-established mentors, the capacity of the young and start-up entrepreneurs may not be fully developed. Gaps in mentality can also lead to poor enterprise decisions as they pertain to the market environment, operations, and dynamics.

As with most entrepreneurial endeavours, the pursuit of financial freedom is a major driver. However, issues of start-up capital appear to be a recurring challenge for start-up enterprises in emerging economies that are characterised by volatile macroeconomic indicators and significant financial deficits. In this regard, government intervention through the creation of special-purpose funding mechanisms to assist start-up firms, especially in the real estate sector, given its substantial contribution to the national GDP. It might also be expected that institutions of higher learning expose students to innovative financing schemes through entrepreneurial training and discourses integrated into the teaching curriculum. Finally, the constraints arising from sociocultural barriers appear to impact females more than males.

An examination of the entrepreneurial preferences through the lens of TPB showed why real estate students' intentions diverge from their preferences for entrepreneurship. While motivators and subjective norms, such as economic factors, familial support, drive intent, the perceived control is weakened by systemic barriers like financial and socio-cultural limitations. Addressing these barriers through targeted support systems/mentoring could help bridge the gap between students' intentions and action, thereby fostering increasing entrepreneurial activities among real estate graduates in emerging markets. Although this study has achieved its objectives within the context of an emerging sub-Saharan African business environment, further studies could examine the long-run career trajectories of real estate students and the influence of socioeconomic and demographic variables on the actual career pathways. Thus, the results of this study are only indicative of students' intentions toward real estate venture creation.

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Appendix

(a) Descriptive: Respondents gender and subscale of personal preference/fulfilment

Gender		Mean	Std. Dev.	N
Personal preference/fulfilment	Male	3.57	.855	90
	Female	3.84	.752	64
	Total	3.69	.822	154

R Squared = .026 (Adjusted R Squared = .020)

(b) Descriptive: Respondents father's educational background and subscale of prestige/status

Father's educational background		Mean	Std. Dev.
Prestige/status	No formal education	3.67	.577
	FSLC	3.50	1.265
	SSCE	4.22	.441
	Vocational/Technical	4.31	1.014
	NCE/OND	4.18	.874
	HND/BSC	4.07	1.066
	MSc/PhD	3.40	1.041
	Total	3.93	1.065

R Squared = 0.090 (Adjusted R Squared = .052)

(c) Descriptive: Respondents family status and subscale of economic interest

Family status		Mean	Std. Dev.
Economic interest	Low income	4.09	0.511
	Middle income	3.86	0.843
	High income	3.14	1.079
	Total	3.82	0.859

R Squared = 0.050 (Adjusted R Squared = 0.037)

(d) Descriptive: Respondents gender and subscale of risk perception/sociocultural barriers

Gender		Mean	Std. Dev
Risk perception/sociocultural barriers	Male	3.11	0.971
	Female	3.55	1.025
	Total	3.29	1.014

R Squared = 0.047 (Adjusted R Squared = 0.041)

(e) Descriptive: Respondents father's occupation and subscale of risk perception/sociocultural barriers

Father's Occupation		Mean	Std. Dev.
Risk perception/sociocultural barriers	Self-employed/Business	3.46	1.038
	Public sector employee	3.14	0.901
	Private sector employee	3.47	0.971
	Retired	2.85	1.076
	Total	3.28	1.025

R Squared = 0.051 (Adjusted R Squared = .032)

(f) Descriptive: Mode admission and subscales of support system/market environment and risk perception/sociocultural barriers

Mode Admission		Mean	Std. Dev.
a. Support system/market environment	Direct Entry	3.35	0.894
	University Matric Examination	2.96	0.929
	Total	3.07	0.933
b. Risk perception/sociocultural barriers	Direct Entry	3.75	0.899
	University Matric Examination	3.11	0.991
	Total	3.28	1.006

a. R Squared = 0.035 (Adjusted R Squared = 0.029)
b. R Squared = 0.083 (Adjusted R Squared = 0.077)

SURVEY INSTRUMENT

SECTION A: Respondent's Profile

Please tick (√) as appropriate

1. Age of respondent (a) 20 years and below [ ] (b) 21 – 25 [ ] (c) 26 – 30 [ ] (d) 31 & Above [ ]
2. Gender of respondent (a) Male [ ] (b) Female [ ]
3. Marital status of respondent (a) Single [ ] (b) Married [ ] (c) Others, *pls. specify* _____
4. Father's educational background (a) No Formal Education [ ] (b) Primary School [ ] (c) High School [ ] (d) Vocational/Technical [ ] (e) NCE/OND [ ] (f) HND/BSc [ ] (g) MSc/PhD [ ]
6. Mother's educational background (a) No Formal Education [ ] (b) Primary School [ ] (c) High School [ ] (d) Vocational/Technical [ ] (e) NCE/OND [ ] (f) HND/BSc [ ] (g) MSc/PhD [ ]
7. Father's occupation (a) Self Employed/Business [ ] (b) Public/Private sector employee [ ] (c) Retired [ ] (d) Others, please specify …….
8. Mother's occupation (a) Self Employed/Business [ ] (b) Public/Private sector employee [ ] (c) Retired [ ] (d) Others, please specify …….
9. Family economic status (a) Low Income [ ] (b) Middle Income [ ] (c) High Income [ ]
10. Mode of Admission (a) Direct Entry [ ] (b) Pre-degree/UTME [ ]

SECTION B: Perception Regarding Real Estate Entrepreneurship

11. Do you have intentions of starting up a real estate firm or business upon graduation, either part time or full time? (a) Certainly (b) Most Likely (c) Indifferent (d) Never (e) Certainly Never
12. Kindly *rate your level of preference* for the following area of real estate business

1 (Minimum Preference) to 5 (Maximum Preference)

S/N	Aspects of Real Estate Business	1	2	3	4	5
1	Property Management/Real Estate Agency					
2	Property Development					
3	Valuation					
4	Market Analysis and Data Management					
5	Feasibility and Viability Appraiser					
6	Facility Management					
7	Others, please specify……..					

SECTION C: Factors Influencing Entrepreneurial Intention

Indicate your level of agreement with the following statements *1 (Total Disagreement) to 5(Total Agreement)*

A. Motivators to real estate entrepreneurial intentions

S/N	Motivators	1	2	3	4	5
1	To provide employment					
2	To have job security					
3	To take advantage of opportunities in the market					
4	To take advantage of my innate business talent					
5	To provide support for younger real estate entrepreneurs					
6	For my own satisfaction and growth					

7	To be my own boss					
8	To realise my dream					
9	For my personal freedom/flexible working time					
10	To challenge myself					
11	Good economic environment					
12	I enjoy taking risk and investing					
13	To have financial freedom and independence					
14	Possibility of attaining higher income					
15	To sustain the entrepreneurial family culture					
16	Increase my prestige and status					
17	Desire to follow the example of my role model(s)					
18	Personal fulfilment					
19	Helping others fulfil their dreams/desires regarding housing/shelter					
20	Ability to measure direct output of investments					
21	Desire for independence					
22	Ability to choose own work task					
23	I enjoy motivating others					
24	Preference for varied and non-repetitive tasks					
25	To take advantage of my education and training					
26	Real estate business has potential to make me rich					
27	I can cope with job demand required in real estate business/practise					
28	Others*, please specify and rank……..*					

B. Obstacles to real estate entrepreneurial intentions

Indicate your level of agreement with the following statements *1 (Total Disagreement) to 5(Total Agreement)*

S/N	Challenges	1	2	3	4	5
1	Lack of personal savings					
2	Difficulty in obtaining bank finance for start up					
3	Lack of assets for collateral					
4	Lack of real estate business skills (financial, marketing)					
5	Lack of information about how to start a real estate business					
6	Lack of real estate business experience					
7	Lack of information about any government agency that can assist in funding real estate business					
8	High cost of business registration					
9	The risk in real estate practise is too much to allow me engage in the practise					
10	Future uncertainty about the local market					
11	Fear of business failure					
12	Weak economic environment					
13	Lack of support from family and/or friends					
14	Lack of support from real estate business mentors					
15	Difficulty in convincing about real estate business idea					
16	Difficult to find right partners to start a real estate business					
17	Rigorous registration process with the professional bodies					
18	The risk involved does not match the time and effort					

19	Lack of requisite human resources and connections to start a real estate business					
20	Lack of mentors to guide in starting a real estate business					
21	Others, *please specify and rank*……..					

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40 Years of Real Estate Development history and its Implications for Real Estate Research in Africa

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Abstract

This paper weaves together forty years of real estate development history with the research agendas highlighted by academics over the years and interviews with prominent African real estate professors to provide insights into the most important research topics in African real estate. The development history captures highlights from four editions of *Professional Real Estate Development: the ULI Guide to the Industry,* written by the first author every ten years. Each edition captures lessons from the most recent real estate crash as well as the evolution of the development industry in the United States. Based on interviews and analysis of literature, the major topics fall into the following buckets: housing, finance, discrimination, data, sustainability, infrastructure, land reform, and digitisation. The conclusions highlight the most important real estate issues facing African urban and real estate development, including all aspects of real estate that influence development – the institutionalisation of the industry both with respect to individual developers and finance companies; the evolution of mortgage markets, including secondary markets and public investment vehicles; urban development cycles and their impact on real estate value; government policies with respect to land development, land regularisation, infrastructure, transportation, corruption, and globalisation; and sustainability and climate change. Of particular

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importance are how to deliver more affordable housing; smart growth with respect to planning and construction; climate change and its impact on flooding, fires, insurance, and resettlement; land regularisation, information and data sharing; and mortgage market evolution and credit availability. While an understanding of the evolution of real estate development in the United States and Western countries is instructive for the future of urban growth in Africa, the continent faces a unique set of challenges and opportunities. While many of these issues cut across areas of real estate that are broader than just real estate development, the topics presented here represent a consensus of some of the leading academics in Africa and offer a roadmap of important research areas for up-and-coming scholars.

Keywords: *Real Estate Development, Urban Development History, Research Agenda, Africa, African Real Estate*

1. Introduction

The impetus for this paper was a keynote address the first author delivered to the African Real Estate Society (AFRES) at its annual meeting in Livingstone, Zambia, on September 12, 2024. While it includes personal reflections on the history of real estate development over the last forty years, it encapsulates the lessons from more than 400 interviews of prominent real estate developments, lenders, architects, consultants, government officials, investors, and others who have contributed to the four editions of the ULI book, *Professional Real Estate Development: the ULI Guide to the Business*. This book has become the Urban Land Institute's all-time best-seller.

My thesis is that real estate development in Africa, as in all other parts of the developing world, follows a trajectory that the most developed countries, like the United States, Japan, and Western Europe, have followed as they urbanised. The institutions and policies that shape urban growth and real estate development, as well as the financing, legal frameworks, and organisational structures, are common to all developing countries. A full treatise would be many volumes long, but this paper attempts to capture the most important lessons from developers over the last forty years and their implications for real estate development research in Africa. It should be noted that there is a colonial history that has severely impacted spatial outcomes.

African countries have long suffered from a lack of transparency. As noted by the JLL Transparency Report (2024), Sub-Saharan Africa has made the least progress. The report observes that enhanced market data coverage and access have occurred in Kenya, Nigeria and Ghana, but most countries have "registered minimal change as limited legal and regulatory frameworks, governance challenges, a lack of urban infrastructure planning and management experience and barriers to institutional investment combine to hold back progress." (JLL, 2024, p. 20). Transparency is critical for bolstering the real estate financial markets as well as property investment. Africa is diverse across both developed and emerging market countries. The priorities for research on real estate development are different across these two groups.[1] It should also be noted that significant differences across African countries will have an impact on the research priorities. Land tenure and self-built housing production are more important issues in Tanzania, for example, than they are in South Africa. Different governance structures will affect the public policy and regulatory responses, and these in turn will impact housing production and prices as well as non-residential development.

We proceed as follows. We begin with lessons from forty years of development history as captured in the ULI book. We then catalogue the primary research questions that have been addressed in the Journal of the American Real Estate Society (ARES). Next, we examine the primary research questions addressed in the Journal of AFRES. We conclude with a series of interviews with leading members of AFRES and our summary of what the most important research topics are that face scholars on African real estate development over the next ten to twenty years.

2. 40 Years of Real Estate Development History

The history of real estate development is marked primarily by the real estate crashes that seem to occur about every ten years. Every developer – in fact, every real estate professional – marks his/her career by the number of real estate crashes that s/he has survived.

The first edition of *Professional Real Estate Development* was published in 1992.(Peiser with Schwanke, 1992) Subsequent editions were published approximately every ten years – in 2003, 2012, and 2022. (Peiser with Frei, 2003; Peiser and Hamilton, 2012; Peiser et al, 2023)

At the time of the first edition, the real estate industry was in crisis, suffering through the collapse of the Savings and Loan industry (S&L Crisis), which began in 1986 in Texas and was still being felt in many parts of the country, notably the east and west coasts, in the early 1990s. Real estate development has historically been led by small local and regional developers focusing on a single product type. The 1980s and early 1990s marked the first appearance of institutional developers, led by institutional finance, financial backing from insurance companies and pension funds. While a handful of national developers were emerging in the United States, like Hines and Trammel Crow, and like Lendlease in Australia, development was still led by individual entrepreneurs who started in their local market and then expanded to other areas. Retail developers were the largest and most concentrated, with a handful of regional mall developers like General Growth, Taubman, Simon, Hahn, and DeBartolo. Real Estate Investment Trusts (REITs), which had more or less died in the early 1980s, made a major comeback with the invention of UpREITs that paved the way for companies like Taubman to acquire the assets of other regional mall developers, whereby the seller could defer their capital gains (see Ambrose and Linneman, 2001).

The major change in the development industry in the 1990s was the slow transition from individual entrepreneurs to more institutional players – the demise of small developers. Larger developers could access institutional financing that allowed them to grow faster. As smaller developers became less competitive, larger developers bought them out or took away their market shares. Small developers could still survive by remaining small and picking up the leftovers, doing joint ventures with larger players or institutions, building in planned communities where a large share of the profits went to the community developer, or moving to outlying areas where land was cheaper and larger players had not yet arrived.

The second edition of *Professional Real Estate Development* emphasised changes that occurred in the aftermath of the Savings and Loan (S&L) crisis. Major trends can be summarised as follows:

- Real Estate Finance – multiproduct financial providers, homogenisation of services.
- Institutionalisation – Real estate becomes Investment Grade, starting with office and retail. Status of an asset class comparable to stocks and bonds.
- Tax Reform – wiped out syndicators. Restored cash flow criteria.

- Merchant Builders – huge debt and equity influx from Wall St and REITS after S&L crash led developers to become merchant builders rather than long-term owners.
- Service businesses added to development for consistent cash flow – the largest developers added brokerage, asset and property management. Wall Street valued steady cash flows more than cyclical development fees.

Two of the major emerging issues were how to pay for infrastructure and the first technological revolution. Following the tax revolt that began in California with Proposition 13 in 1978 and was picked up across the country, developers were hit with high impact fees and exactions to pay for infrastructure that previously had been paid for by the public sector. Developers learnt that they had a major stake in how cities paid for infrastructure and helped solve local fiscal problems. The technological revolution began with the first use of the Web to market properties, provide online financing, and systematise property management and building operations. Entitlements and planning approvals were becoming more contentious with five major parties to every planning decision: planners, developers, political figures, neighbourhood groups, and the community-at-large. The solution to paralysis of conflict was transitory coalitions among the five groups (see Peiser, 1990). Smart growth emerged as a key approach to development – creating density around transit to support public transportation and sustainable development. Along with smart growth, other central issues included environmental concerns, improving public transit and reducing congestion, and placemaking – creating mixed-use development districts rather than single-purpose zoning districts.

3. 2012 – 3rd Edition of *Professional Real Estate Development*

The third edition of the development book came out three years after the Great Recession of 2008-9. This crash followed the run-up of real estate values to extraordinary levels that peaked in 2006-7 and was marked by subprime mortgages and 'liar loans', which were undocumented mortgages to borrowers who purchased homes and condos at inflated values and then defaulted on the mortgages when housing values collapsed. Globalisation and financial innovation contributed to the crisis by dramatically increasing the volume and technical complexity of real estate financing as well as credit availability (Laposa and Mueller, 2017; Chervachidze and Wheaton, 2013). Cheap and easy credit boosted demand, especially for housing and condominiums. In addition, the slicing and dicing of subprime mortgage securitisation into tranches that carried much more risk from liar loans led to massive defaults of the underlying bonds. Warren Buffett famously referred to derivatives as "financial weapons of mass destruction" in early 2003 (BBC News, 2003)

Among the lessons of the crash were the following:

- Cash is King – Liquidity is paramount.
- Refinancing, hibernating, and pursuing consulting business.
- Coveted institutional financial partners.
- Acquisition terms are as important as price.
- Flight to quality accompanies declining demand.

By 2009-10, tremendous buying opportunities were available to developers and investors with cash. The strongest investors preferred to invest in whole businesses rather than individual properties.

Two decades of consolidation have transformed the development industry from a game of small entrepreneurs to a sophisticated capital market favouring public companies. Entrepreneurial developers can still compete because large institutions are less flexible, have higher pursuit costs, and are less able to respond to market opportunities. But they must have a strong balance sheet and a strong track record, or a working alliance with a capital source.

The regulatory environment had stiffened considerably by 2012. Climate change awareness was just beginning, with developers facing a web of water rights, stormwater, wildlife habitat, traffic concerns and wildfires. Reducing carbon emissions emerged as the primary measure for improving climate resilience. Developers have always preferred zoning by-right and other regulations that were clear and reduced *uncertainty* in obtaining regulatory approvals. Unfortunately, discretionary approvals have only increased over time, giving city councils and the public greater opportunity to stop or influence even small property development.

Among the advice given by the ULI's most famous developers, Gerald Hines stated that community acceptance is key. Each city has a different culture that developers must understand and work within. Ron Terwilliger stated that pioneering resort developer Charles Frasier was a visionary and dreamer way ahead of his time in terms of the environment, but he had poor risk management (Pieser and Hamilton, 2012). "Trammell Crow was visionary and an optimist, and charismatic. He was very generous and pioneered the partner concept." Terwilliger advised entrepreneurial developers to "be a local sharpshooter focusing on market niches that big guys can't afford to pursue." (Pieser and Hamilton, 2012).

4. 2022 – the 4th Edition of *Professional Real Estate Development*

The 4th edition of *Professional Real Estate Development* came out just as life was getting back to normal after the COVID-19 virus shut down most cities for anywhere from 4 months to over two years. The shutdowns began in March 2020 and had profound impacts on how people lived, worked, shopped, and played. Many of the impacts are still being felt to this day. COVID resembled a hurricane disaster, except all markets were affected at once. The United States government froze the ability of landlords to evict bad tenants like drug dealers, which caused many apartment communities, especially those catering to lower-income tenants, to become less safe.

COVID caused an increase in demand for integrated home workspaces and an emphasis on access to outdoor spaces, both public and private. HVAC (heating, venting, and air conditioning) alterations to enhance air circulation and filtration and the addition of home offices showed an increase in demand. Other impacts on residential properties included an increase in parking to accommodate more residents working from home, the use of local supply chains, the installation of touchless restrooms and keypads for tenants, and a greater emphasis on clean environments, increased property maintenance, and enhanced building safety and disinfection.

The impacts were most severe on the office sector and the retail sector. After the shutdowns, the vast majority of companies have moved to a hybrid work model whereby people work from home at least one or two days a week. The long-term impacts on the office market indicate that as much as 30% of the office buildings in many cities will never return to full occupancy. These buildings must either be torn down or converted to some other use. While office-to-residential conversions are popular, Gensler estimates that only 15-30% of the total office building stock can be converted economically (Peiser, Kindler, & Paynter, 2024).

The retail sector has recovered more quickly, but retail service in downtowns and in office districts has continued to suffer along with the office market. Surprisingly, home sales, especially in resort and more rural areas, skyrocketed during COVID as people sought homes with more space and in more rural areas since they did not have to commute to work (Pieser & Hamilton, 2012). Similarly, larger apartments prospered during COVID as renters desired more space for home offices, and people's incomes were maintained by the CARES Act (Coronavirus Aid, Relief, and Economic Security Act, passed in 2020), which pumped $2.2 trillion economic stimulus into the economy and fed the inflation spiral that followed COVID. The industrial sector did relatively well under COVID, as warehouse space was needed for companies serving online ordering and purchases (Peiser, R. et al, 2023).

5. Trends

The major new trends in real estate development can be summarised as follows:

- ESG – Environmental, social and governance. Emphasis on new metrics for evaluating projects both by communities and by investors based on ESG objectives.
- More voice for stakeholders and more diverse teams.
- Application of technology through every step of development - PropTech
- Patterns of work, shopping, and dwelling are changing fast.
- Affordability, inclusion, and social justice should be addressed by development, land use regulation and finance.
- Even small-scale development is more complicated than it was previously.
- Decoupling of capital between China and the West.

6. Implications for African Real Estate Research

40 years of real estate development history provide insights into key issues that are relevant to African real estate research, even while the development trajectory of emerging market nations does not necessarily follow the same path as those of the United States and Western Europe. Still, issues that are relevant for research in more industrialised nations guide scholars in Africa.

Several scholars have addressed research agendas and topics. Newell (2003) analysed 71 papers published in the Pacific Rim Property Research Journal between 2001 and 2002. Valuation, housing markets, and listed property companies were the top three topics published (see Table 1):

Table 1: Content Analysis of Topics Covered in Newell (2003).

Common topics	Percentage
Valuation	20
Residential and housing markets	18
Property companies/Listed Property Trusts	11
Analysis of property markets	10
Corporate real estate	8
International and domestic property investment and methodological issues	7
Property finance	7
Property forecasting and property cycles	6
Property education and property research issues	4
Property rights	3

In 2021, Newell listed what he saw as future research opportunities in alternative real estate sectors:

- Healthcare: ageing demographic and increased healthcare requirements for the ageing population
- Data centres: expansion in information technology requirements
- Student accommodation: growth in international students
- Retirement: ageing demographic and baby boomers: The traditional Asian model of children caring for their elderly parents is not seen as being acceptable to young generations
- Self-storage: downsizing, death and divorce.

Babawale and Emele surveyed the literature as well as performed a direct survey of estate surveyors and valuers for their article on real estate research in Nigeria (Babawale and Emele, 2016). Table 10 in their article lists the respondents' research priorities:

Table 2: Respondents' Real Estate Research Priorities in Babawale and Emele (Table 10, 2016)

Options	Mean	Rank
Real estate portfolio management	4.74	1
Valuation and related topics	4.70	2
Real estate in the capital markets	4.48	3
Real estate investment and finance	4.46	4
Real estate indices	4.20	5
Real estate forecasting and real estate cycles	4.02	6
Facility management/green building	3.72	7
Corporate real estate management and corporate strategy	3.58	8
Housing and livability	3.44	9
Environmental management and emerging issues	3.38	10
Land economics, urban land use and issues of sustainability	3.20	11
Property taxation and rating	2.72	12
Property development, management and project management	2.39	13
Laws and legislations and their effects on real estate	2.07	14

These priorities reflect the views of valuers and surveyors in Nigeria, rather than the real estate community at large, but the priorities are revealing. The top six research priorities are related to finance, investment, and valuation, reflecting the importance of the lack of capital and financing in developing countries and the importance of enlarging the pool available for real estate.

Adewenmi and Olaleye (2011) received 135 responses from the Lagos branch of the Nigerian Institution of Estate Surveyors. Their general research priorities are shown in Table 3:

Table 3: General Real Estate Research Priorities in Adewunmi and Olaleye (Exhibit 2, 2011)

Statement	Mean Score	Rank
Development finance	4.635	1
Land policy issues	4.600	2
Land accessibility	4.506	3
Performance measurement of property	4.365	4
Property investment strategies	4.282	5
Regulatory changes affecting property	4.247	6
Microeconomic factors affecting property	4.200	7
Facilities management	4.165	8
Property and portfolios risk management	3.929	9
Macroeconomic factors affecting property	3.882	10
Role of property in mixed-asset portfolios	3.847	11
Demographic changes affecting property	3.753	12
Technological factors affecting property	3.741	13
Diversification within property portfolios	3.694	14
Publicly traded property investments	3.635	15

Adewunmi and Olaleye (2011) compared their results to those of a survey of fund managers by Newell, Worzala, McAllister, and Schulte (2004, p. 163) and observe that the top four Australian priorities are "(1) the role of real estate in a mixed-asset portfolio; (2) real estate and portfolio risk management; (3) performance measures for real estate; and (4) diversification within real estate portfolios." (Adewunmi and Olaleye, 2011, p. 131). They noted that these four topics were ranked 11th, 9th, 4th, and 14th in the Nigerian survey. They concluded that the fact that development finance ranks highest in developing countries compared to lower ranking in developed countries reflects the minimal accessibility to capital. "Developing markets need more sources of capital." (p. 132). Similarly, the high ranking of land accessibility in the Nigerian survey reflects the difficulty of acquiring land and perfecting title.

Newell et al. (2004) also rank specific research topics for Nigeria (Newell et al, 2024, p. 134). The top six are:

1. Impact of capital flows in and out of the property market
2. Land reforms
3. Taxation factors affecting property
4. Forecasting methodologies for markets, rents, returns
5. Computerisation of land registries
6. Securitisation and real estate

They conclude that in developing countries like Nigeria, the research priorities, while in many ways being similar to developed countries, place more emphasis on land accessibility for development and financial intermediation opportunities.

Ayodele, Oladeji, and Olaleye (2023) evaluated submissions to the AfRES conferences from 2011-2022. Their aggregate submissions produced the following chart (Figure 4 in their paper):

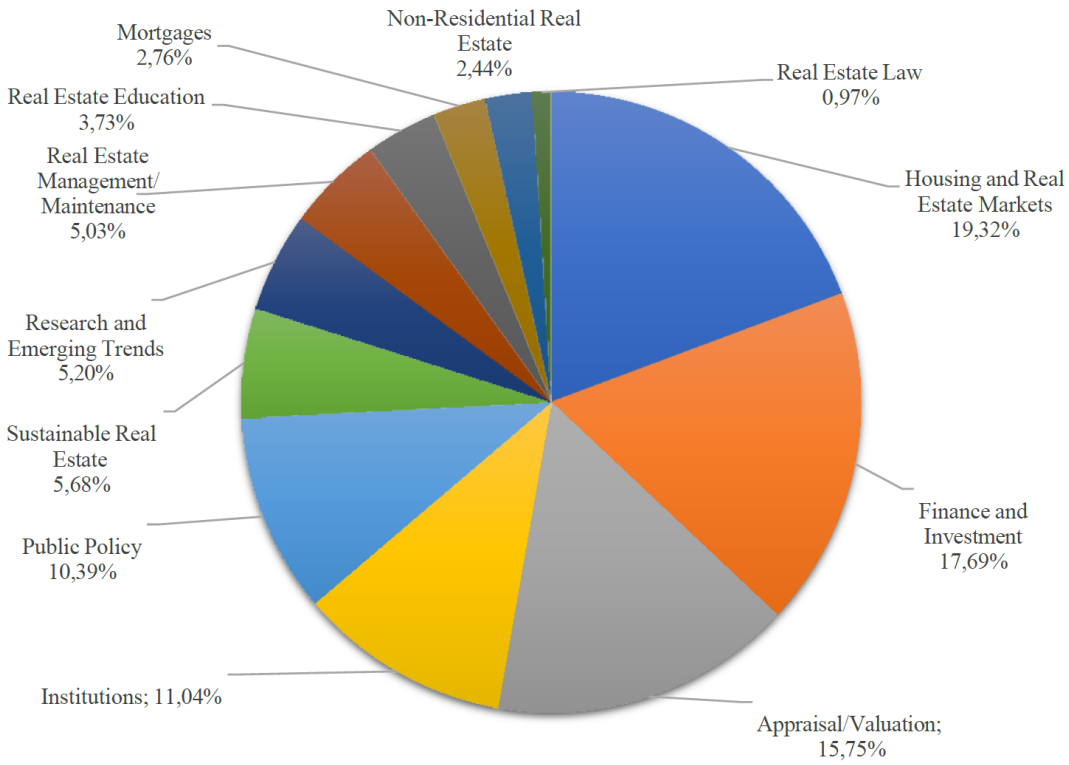

Figure 1
AfRES Conference Submissions 2011-2022

Source: Ayodele et al., 2023, p. 101.

Housing and markets, finance and investment, and appraisal/valuation dominate the submission topics. While some of the hottest current topics, including sustainability and technological innovation, were growing in numbers, they were a smaller percentage of the total submissions. They note that Nigeria, Ghana, and South Africa had more numerous submissions than other African countries. They conclude from their analysis that there is "increasing market sophistication and a catching up with global discourse in real estate trends" (Ayodele et al., 2023, p. 104).

7. Interviews and questionnaires with African Academics

After reviewing the relevant literature, we conducted a series of interviews and questionnaires with notable real estate academics and one practitioner in Africa. While the interviews are not intended to be an exhaustive list, the most important research topics of these ten prominent scholars reflect their sense of priorities based on their perspective on major issues impacting African real estate. Table 4 summarises the top research priorities of the ten prominent African real estate professionals, who are the respondents for this study[2]:

Table 4
Research Topic Priorites of African Professors

Housing deficit and affordable housing	R025NG1	Housing
Housing that is acceptable in local context	R025NG1	Housing
Housing insecurity among the vulnerable and poor, especially rental	R025NG2	Housing
Assessment of housing insecurity and affordable housing policy interventions.	R025NG3	Housing
Housing affordability and infrastructural challenges; (Social housing).	R025NG4	Housing
Affordable Housing Delivery and Finance	R025SA1	Housing
Affordable housing	R025EA1	Housing
Affordable Housing (how to reduce construction costs, state subsidies, mortgages, changing the mindset of population)	R025OT1	Housing
Affordable housing financing options	R025EA2	Housing
Rental vs owner occupied housing (rental vs sale housing projects)	R025EA2	Housing
Market Transparency (land registry, property databank, digitalization)	R025OT1	Digitalization
Innovative technologies for low cost housing	R025EA1	Digitalization
Digitalization of land market and information;	R025NG4	Digitalization
Real estate and blockchain technology. Looking at digitized securitization (Real estate tokenization), metaverse and digitized real estate marketing	R025NG4	Digitalization
Bitcoin	R025SA2	Digitalization
Land reforms/ Land registration/ digitization – How to speed up regularization, and impacts from failure to do so.	R025SA3	Land
Land Availability and Management	R025SA1	Land
Access to land for large-scale investment in rural Africa	R025EA1	Land
Satellite towns vs urban renewals/gentrification/land pooling	R025EA2	Land
Ways of improving access to planned, demarcated, titled and serviced land	R025EA2	Land
Adaptation of ESG in RE Investment, Appraisal, and Market Analysis	R025NG3	Sustainability
Smart and sustainable building construction and management; Building	R025NG3	Sustainability
Sustainable approach to property development and financing retrofitting	R025NG4	Sustainability
Climate change	R025SA2	Sustainability
Carbon trading markets	R025EA1	Sustainability
Employabiity, Contemporary Skills, and Curriculum Review for RE Education	R025NG3	Education
Real estate education and training for practice and national development	R025NG4	Education
Real estate education	R025EA1	Education
Real Estate Education (creating an interdisciplinary Africa-specific curriculum)	R025OT1	Education
Political stability	R025SA2	Governance
Urbanization and local government policies.	R025SA1	Governance
Governance	R025SA2	Governance
Regulatory frameworks	R025EA1	Governance
Financing to increase affordability	R025NG1	Finance
Financial markets development – How to increase public stock exchange presence and utilization	R025SA3	Finance - public markets
REITs development and liquidity issues in real estate. REITs are still under-developed in most African countries	R025NG4	Finance - REITs
Discrimination, gender injustice, and inequalities	R025NG2	Discrimination
How to mitigate discrimination-based factors	R025NG2	Discrimination
Govt policy instruments to reduce discrimination in real estate	R025NG2	Discrimination
Infrastructure development – how to finance	R025SA3	Infrastructure
Infrastructure and its influence on real estate market	R025EA1	Infrastructure
Infrastructure Development (financing, participation of the local population in the construction process)	R025OT1	Infrastrucuture
Data driven housing markets in Emerging Economics: Issues and Challenges	R025NG3	Data
Centralized real estate data collation and sharing (databank) for investment and appraisal; Market efficiency and transparency.	R025NG3	Data
Foreign Direct Investment – Impact on indebtedness, growth, sovereignty, and control. Spillover effects on RE ownership	R025SA3	FDI
Foreign Direct Investment (how to attract capital? how to reduce political risk?)	R025OT1	FDI
Young population – impact of youth unrest and solutions	R025SA3	Other
Adoption of Proptech in RE Practice	R025NG3	Other
The role of the property sector in the macro- economy.	R025SA1	Other
Valuation Standards	R025SA1	Other
Security	R025SA2	Other

Many of the research topics, such as the young population (demographics), affect all aspects of real estate, not just property development narrowly defined. Among the real estate research priorities, housing tops the list. Affordable housing is, of course, a worldwide problem both in the industrialised and in the developing world. Housing insecurity among the vulnerable and poor, infrastructure challenges, and the need for social housing top the list of priorities. Closely related are concerns about discrimination in housing and other areas of real estate.

Digitalisation and land reform ranked second on the list of research topics denoted by the professors. Market transparency, available market data, digitalisation of land markets, and blockchain and real estate tokenisation are all topics in need of more research. Similarly, land reform, access to land for large-scale investment, and urban growth issues relating to urban fringe versus urban renewal and gentrification are also cited as important areas for research.

Only slightly less mentioned were the areas of sustainability, real estate education, and governance. Sustainability issues range from ESG to smart buildings, climate change impacts, and carbon trading. Several professors emphasised problems relating to governance – urbanisation and local government policies, regulatory frameworks, and political stability. Real estate finance, discrimination, infrastructure, data, and foreign direct investment (FDI) round out the list of research topics listed by the real estate professors.

Real estate finance and availability of mortgages, as well as financial market development, were also mentioned by several interviewees. R025NG3 emphasised the need for better data for housing markets as well as centralised data collation for investment and appraisal, market efficiency, and transparency. He also emphasised the need for research on ESG and sustainability as well as Proptech. R025SA3 the need for research on infrastructure finance, land reform, and foreign direct investment and its impact on indebtedness, growth, sovereignty, and control. Finally, R025NG4 also referenced research on the digitisation of land markets and blockchain technology, two subjects that are equally important outside of Africa.

R025SA2 emphasised how climate change is affecting where people can and cannot live. Patterns of rain and temperature are changing completely. Our understanding of how these affect materials we use for building, methods of construction, prices of real estate, and where people live is all being challenged. R025SA2 also emphasised how problems in governance impact corruption in most African countries and the need for research to examine real estate through the lens of corruption to get better outcomes. Closely related, R025SA2 noted that criminal gangs love instability: “How do you maintain security with high poverty and unemployment?” Concentrations of the poor cause property values to fall and enable corrupt officials to manipulate the government. R025SA2 observed that problems of governance and security play out differently in South Africa and Egypt, and research into these areas needs to be country-specific.

8. Synthesis and Conclusions

Forty years of real estate development history offer useful insights into African research topics. It also reveals two key points: Real estate development is the profession for creating and improving real estate, but it is only one of several professional activities that are encompassed by the real estate industry (brokerage, appraisal, architecture, city planning, construction, systems engineering, asset management, property management, mortgage banking, and so forth). Nonetheless, forty years of real estate development history raised a host of research issues that are important to improving property development and its impact on people’s quality of life. The second

key point is that real estate cycles reveal a multitude of weaknesses in the real estate industry. It is noteworthy that publishing a new edition of *Professional Real Estate Development* every ten years accentuated a new real estate crash, even when we thought the last crash was the worst of the century. Over the last forty years, the United States has experienced two major real estate crashes where property values dropped 30-50 percent: the savings and loan crash in the late 1980s-early 1990s, and the Great Recession in 2008-10. In addition, parts of the industry suffered from the tech bubble and the Asian financial crisis in the late 1990s. The latest edition (2022) was published after an unexpected event, like COVID, precipitated a far-reaching restructuring of the real estate industry – most recently, turning the office and retail markets upside down while benefiting residential and industrial markets. The resilience of cities and the real estate industry in general to weather these periodic disruptions underscores the need for research within the African context on the key topics highlighted by the African professors. Out of the ashes come a multitude of lessons as well as opportunities to make new fortunes and correct the mistakes that led to the previous collapse.

A review of forty years of real estate development history highlights the following research issues:

- The evolution of the mortgage market, secondary markets, and public investment vehicles such as REITs, and the globalisation of finance and investment.
- The institutionalisation of both real estate companies and the real estate finance industry.
- The rise in housing affordability is a worldwide problem that is especially acute in larger cities.
- The unending cycle of neighbourhood changes and its impact on real estate values.
- A wide range of government policies with respect to regulation, infrastructure.
- Transportation, and other factors that determine long-term real estate value;
- The increasing importance of sustainability and climate change.

The literature review with respect to research priorities highlighted a different set of topics from those that emerge from the analysis of forty years of real estate development. It is not surprising, given who was surveyed (chartered surveyors), that Graham Newell's list of research topics in 2011 emphasised valuation, housing markets, and listed property trusts.

Based on the analysis of key research themes in the real estate literature as well as the interviews with prominent academics in Africa, we conclude that the most important research issues for African research are the following:

- Affordable housing – construction, mortgage availability, self-built housing, government policy
- Smart growth – planning (density), construction, transportation, proptech
- Climate change – flooding, fires, insurance, resettlement
- Finance – Mortgage availability, securitisation, secondary mortgage markets, micro-credit
- Land – title, ownership, regularisation, mortgage collateral
- Governance – transparency, regulatory regimes, political turmoil, corruption
- Information and data – shared data banks for market information, finance, investment and appraisal and transparency

Many countries in Africa face deficiencies in transparency and information availability that their counterparts in the developed countries do not face. In particular, the development of metrics to measure progress in each of the above topics is essential for advancement. Organisations that serve industry, like the South African Property Association (SAPOA) and Morgan Stanley Capital International (MSCI), are important not only for helping to fund research but also for providing data and an interface between academics and industry professionals. Industry is often ahead of the academy in developing new technologies and adapting them to practice. Relationships with industry organisations and private data providers are crucial for academics not only to interpret the latest trends but also to have an impact on industry practice.

Key research strategies that will enhance real estate research in Africa include market-specific data collection, geospatial analysis, public-private partnership studies, integrating global and local perspectives, stakeholder engagement and participatory research, social and environmental impact studies, economic modelling, and comparative case studies.

While the evolution of real estate development in the United States and other more highly developed countries is instructive and offers lessons for the likely course of development in Africa, academics in the industrialised countries also have a lot to learn from Africa. Over the 21st century, the amount and pace of development in Africa will be multiples of that in the West. Africa is where the excitement is. Academics should focus on those research topics that will have the biggest impact on the real estate industry and on people's lives, such as how to mitigate climate change disaster damage. There is meaningful research to be done in all seven of the topical areas above. They represent a consensus of some of the leading academics in Africa and offer a roadmap for up-and-coming scholars on property development.

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[1] The interviewee abbreviations denote the year of the interview and location (NG-Nigeria, SA-South Africa, EA-East Africa, OT-Other)

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Spatial Pattern of Residential Land Prices in Dar es Salaam City, Tanzania

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Abstract
The analysis of spatial patterns and variations in urban land prices aids urban planning, socioeconomic analysis, investment decisions, resource allocation, and monitoring of urban spatial growth and land market dynamics. However, scholarly research on the spatial patterns of urban land prices in Sub-Saharan African cities with predominantly informal land markets and settlements remains limited. This study applied spatial statistics to analyse the spatial autocorrelation of residential land prices (RLPs) in Dar es Salaam, Tanzania, aiming to understand their spatial distribution and variation. Global indicators of spatial association (GISA) and Local Indicators of Spatial Association (LISA) were utilised, calculating global Moran's *I* and local Moran's *I*, respectively, using 452 RLP data from 2020 collected by the Government Chief Valuer. GISA results revealed highly clustered RLPs with strong positive spatial autocorrelation (Moran's $I = 0.83$). LISA analysis identified clusters of sub-wards with lower RLPs below the mean, dominating the city's land market. Statistically significant and non-significant LISA results delineated peri-urban and rapidly growing areas. This study provided evidence-based insights for urban planning, policies, infrastructure development, and investor decisions, highlighting the importance of spatial statistics at the regional and sub-regional levels in understanding and improving urban dynamics and land market efficiency.

Keywords: *Spatial pattern; Spatial autocorrelation; Land markets; Residential land price; Dar es Salaam*

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1. Introduction

Land markets encompass more than just land and locations; they also impact the welfare and social issues of urban populations (Cheshire and Sheppard, 2004; Deng, 2024). Additionally, the characteristics of urban land markets may influence the spatial pattern of land prices, impacting the preferences and decisions of prospective land purchasers (Alonso, 1960; Jiang, 2024). The land market in Dar es Salaam is characterised by both formal and informal land transaction channels (Nyakamwe et al., 2022). Consequently, the complexity of urban expansion and development in the city is largely influenced by the spatial pattern of land prices, which results from its complex land market (Bhanjee and Zhang, 2018; Brigham, 1965; Msuya et al., 2021). Analysing the spatial pattern of land prices is an essential and effective way to improve urban planning and management, resource allocation, modeling and forecasting land use changes, and estimating property taxes (Hu et al., 2013; Wang et al., 2024).

In the context of the study, spatial pattern refers to the arrangement or distribution of land prices across different locations in the urban area (Anselin and Getis, 2010; Gamal et al., 2024). Urban land prices are intricately tied to specific locations and their neighbourhoods. The spatial pattern of urban land prices has been studied in various forms, primarily through spatial autocorrelation analysis. Liu et al. (2006) found positive spatial autocorrelation of land prices, with residential land prices showing a much stronger positive autocorrelation than commercial and industrial land. Additionally, Jiao and Liu (2012) studied the spatial autocorrelation of urban land prices from a regional perspective and discovered that land price distribution is influenced by economic factors and local factors such as population, transport infrastructure, and land supply. Similar analyses have been conducted to examine the spatial distribution of industrial land prices, their variations, and industrial impacts (Chen et al., 2018; Wang et al., 2020), as well as the spatial-temporal variations of commercial land prices (Garang et al., 2021). Gamal et al. (2024) further established the relationship between urban clusters and land price variation. These studies demonstrated that real estate prices are spatially autocorrelated variables at various scales and levels. However, none of the existing literature on spatial autocorrelation has been conducted in a city with predominantly informal land markets and settlements to discover the spatial pattern of their respective prices.

Informal land markets, which operate without oversight from authorities, are the primary drivers of urban sprawl and expansion in African countries (Bhanjee and Zhang, 2018). They catalysed the formation of informal settlements in urban areas due to the high demand for housing caused by rapid population growth, leading to informal land transactions (Nyakamwe et al., 2022; Peter and Yang, 2019). It is estimated that over 70% of Africa's urban population resides in informal settlements (Andreasen et al., 2017; Parsa et al., 2011). These settlements are characterised by poor infrastructure and a lack of essential public services and amenities (Peter and Yang, 2019).

In a market economy, land prices tend to increase due to factors such as the natural and socio-economic environment, the availability of public services, and market demand. Conversely, a weak land market and inadequate regional development result in lower land prices (Yang et al., 2020). The vibrant informal land markets in Dar es Salaam reflect the high demand for land; however, these markets are challenged by informal settlements and socio-economic issues (Andreasen et al., 2017; Peter and Yang, 2019).

The focus of this study is to analyse the spatial pattern of residential land prices (RLPs) in Dar es Salaam, Tanzania, to capture their distribution and variation. The study has two specific

objectives: (1) to determine the spatial pattern of RLPs by testing the null hypothesis H0: The Dar es Salaam RLPs are random; and (2) to assess the spatial heterogeneity of prices. The study used the Global Indicators of Spatial Association (GISA) and Local Indicators of Spatial Association (LISA), calculating global Moran's *I* and local Moran's *I*, respectively. The GISA analysis assumes homogeneity across the study area, providing an overall spatial autocorrelation of the RLPs (Barreca et al., 2018), while LISA, a decomposition of GISA, examines spatial autocorrelation of RLPs at the local level (Anselin, 1995). This study utilised RLP data for the year 2020, collected from the office of the Tanzania Government Chief Valuer. Significantly, the study will provide evidence-based insights for urban planning, policy-making, infrastructure development, and investment decisions to improve urban dynamics and land market efficiency.

2. Materials and Methods

2.1. Study area

Dar es Salaam city in Tanzania is the chosen study area. The city covers a total area of 1,393 square kilometres (km^2), which is equivalent to 0.15% of the entire land area of Tanzania. It is bordered by the Coast Region to the North, West, and South, and by the Indian Ocean to the East. The city comprises five municipalities: Ilala, Kinondoni, Ubungo, Temeke, and Kigamboni [Figure 1(a)]. It is one of the top ten fastest-growing cities in Africa and is expected to reach a population of more than 10 million people within 15 years (Güneralp et al., 2018; UN, 2018). The city's growth is primarily driven by rapid population growth rather than industrialisation, unlike cities in developed countries (Mkalawa and Haixiao, 2014). Consequently, this population growth has created a high demand for residential land. According to the 2012 census data, Dar es Salaam city comprises a total of 452 administrative sub-wards. The Kivukoni sub-ward is considered the Central Business District (CBD) of the city. Historically, Dar es Salaam, formerly known as 'Mzizima', originated around the natural sea port located in the Kivukoni area. Dar es Salaam is regarded as the most important economic centre in Tanzania, generating the highest volume of manufactured products and total tax collection across the country (BoT, 2020). The city's unique geographical and socio-economic factors make it an interesting case study area for examining the spatial distribution of RLP.

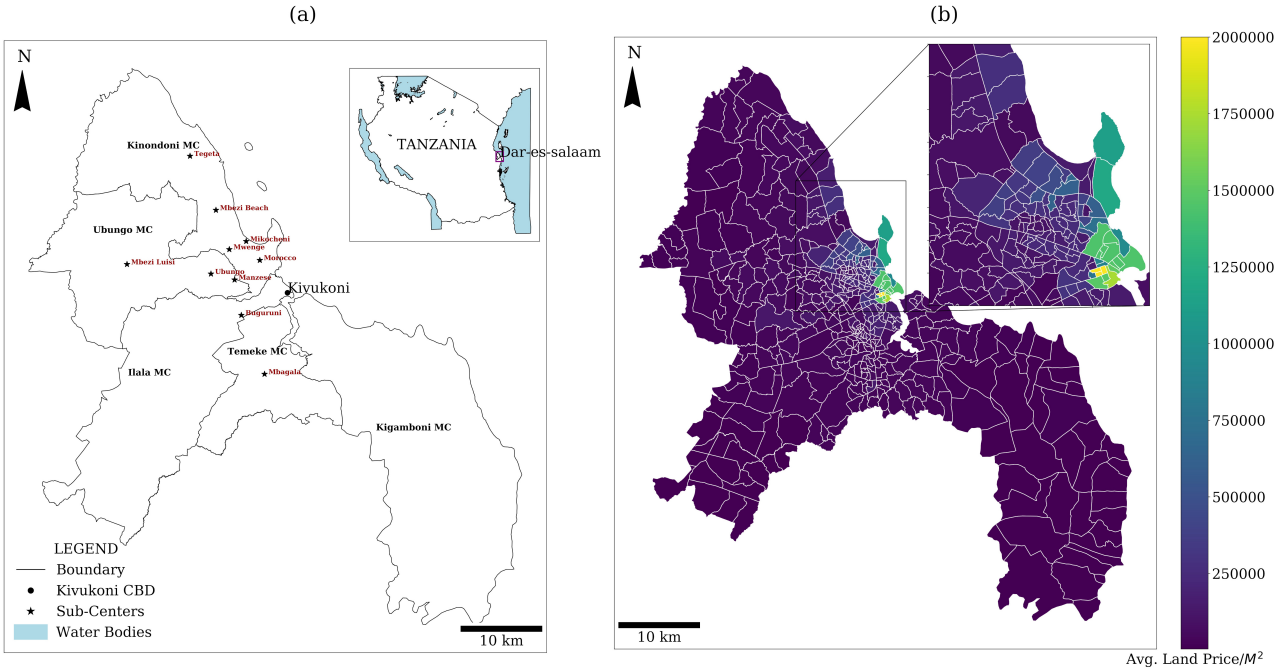

Figure 1: (a) The Dar es Salaam city map in Tanzania with its municipalities (MCs) and CBD location, (b) Mapped Dar es Salaam residential land prices (in Tanzanian Shillings) in 452 sub-wards for the year 2020.

Source: Marandu et al. (2023)

2.2. Data source and pre-processing

Two main types of data were sourced for this study. Firstly, residential land price (RLP) data for the year 2020 were collected from the Government Chief Valuer's office, located in the Ministry of Lands, Housing, and Human Settlements Development. The Chief Valuer's office collects this data through survey methods at specific intervals (every 2-3 years), and the prices are recorded in Tanzanian Shillings (TZS), mostly at the neighbourhood or sub-ward level. Secondly, spatial data, including an administrative map of Dar es Salaam and its 452 sub-ward boundaries, were obtained from the National Bureau of Statistics (NBS) based on the census conducted in 2012.

Average prices were calculated and associated with the respective sub-ward administrative boundaries as aggregate units. Missing data were imputed using the k-Nearest Neighbour (kNN) method (Marandu et al., 2023). Subsequently, a complete sub-ward map and residential land price dataset were generated [Figure 1(b)]. Table 1 presents some descriptive statistics of the RLP data.

Table 1: Basic descriptive statistics of Dar es Salaam residential land prices for the year 2020

No. of records	mean	mode	median	std	Min.	Max.
452	154067.3	35000	53750	306619.72	3750	2000000

2.3. Spatial pattern analysis of residential land price

The spatial pattern analysis in this context refers to analysing the distribution of land prices directly from their defined territorial units or localisation (Souris, 2019). Quantitatively, this includes accounting for the spatial autocorrelation of the phenomena. The spatial autocorrelation is a statistical concept used to define the correlation between the values of objects based on their topological or metric relationships. The resulting coefficient or index accounts for spatial interdependence and reveals the spatial patterns of phenomena, identifying clustering or dispersing patterns that differ significantly from random patterns (Souris, 2019). This concept assumes that spatial dependency exists to a certain extent among the spatial attributes of geographic phenomena (Lee and Li, 2017), reflecting the first law of geography, which states that "everything is related to everything else, but near things are more related than distant things" (Tobler, 1970, p.236). For over four decades, spatial autocorrelation and its approaches have been explored in the literature (Anselin and Getis, 2010; Cliff and Ord, 1970). The spatial autocorrelation indices, such as Moran's index or Moran's *I* (1950) and Geary's C (1954), are widely used to assess whether the geographic phenomena under study exhibit spatial autocorrelation (Jiao and Liu, 2012; Souris, 2019).

The following sections present the methods used to investigate the relationship between the spatial distribution of RLPs at the sub-ward level polygon and their proximity. The analysis was performed at both the global and local levels to gain a broad understanding of the spatial distribution of RLPs. The aim was to test whether the geographical distribution of land prices was random or clustered, and to determine their spatial dependence. Autocorrelation indices were used to investigate the global and local clustering of RLPs (Souris, 2019). Therefore, the following steps were performed: (1) testing the null hypothesis by calculating the global spatial autocorrelation Moran's *I*, and (2) assessing the spatial significance of RLP through local indicators of spatial association (LISA) provided by the local Moran's *I*.

2.3.1. Global assessment of spatial autocorrelation of RLP

The spatial autocorrelation coefficient provided an assessment of the spatial dependence of the Dar es Salaam RLP data. Moran's Index, also known as Moran's *I*, is a widely used spatial autocorrelation measure and was applied to test whether the RLP data were spatially clustered, dispersed, or randomly distributed (Lee and Li, 2017; Moran, 1950). Geographically, the RLP data are represented in sub-ward polygons [Figure 1(b)]. Thus, Moran's *I* can be defined as the mean product of the normalised land prices of pairs of polygons, weighted by "spatial weight" which depends on the contiguity between the polygons in our case study area (Souris, 2019). Since normalisation was performed, the index was expected to range between -1.0 and +1.0. If a positive index was obtained, the null hypothesis that the RLP data were randomly distributed was rejected in favour of the alternative hypothesis that the RLP data were clustered, and vice versa. Equation (1) below represents Moran's *I* (Lee and Li, 2017).

$$I = \frac{n \sum \sum w_{ij}(p_i - \bar{p})(p_j - \bar{p})}{\sum \sum w_{ij} \sum (p_i - \bar{p})(p_i - \bar{p})} \quad (1)$$

In equation (1), n represents the total number of sub-ward polygons being analysed, which is 452 for this study. p_i is the land price of a particular sub-ward polygon $i\bar{p}$ is the mean of land prices p. p_j is the land price from the neighbouring polygon j relative to i; and w_{ij} is the calculated spatial weight for the polygons i and j. The study adopted the queen contiguity first-order method to calculate spatial weights and define neighbours. The standardised weight

matrix from a queen contiguity method is essential for calculating statistical spatial dependence (Barreca et al., 2017, 2018). The queen contiguity weight was calculated using *libpysal*, and Moran's *I* was calculated using *esda.Moran*, both of which are Python language packages from *PySAL (pysal.org)*.

2.3.2. Local assessment of spatial autocorrelation of RLP

The global spatial analysis explained in the above section (Moran's *I*) provides only the overall spatial autocorrelation of RLPs within Dar es Salaam as our study area (Lee and Li, 2017). However, this section aims to closely examine and detail how the spatial autocorrelation of RLP differs from one sub-ward to another in Dar es Salaam. The study adopts the suggested local indicators of spatial association (LISA) for this type of analysis. LISA, also known as the local Moran's index (see Equation (2)), is the decomposition of the global Moran's *I* (Anselin, 1995).

The main goal of this section, as with previous studies, is to highlight the areas or sub-wards that significantly exhibit positive spatial autocorrelation outcomes (hot spots and cold spots) and those that contribute significantly to negative spatial autocorrelation (potential spatial outliers). To achieve this goal, LISA and Moran scatter plots were derived. The Moran scatter plot visually displayed the spatial relationships and identified local clusters (Barreca et al., 2017). Additionally, a map was produced to highlight sub-wards with realisable local clusters (significant positive) and those that were not significant or were potential spatial outliers. Statistical significance was determined using a p-value threshold of 5% ($p < 0.05$), which was calculated for each LISA result.

The Local Moran's Index is defined by the equation below:

$$I_i = z_i \sum_j w_{ij} z_j \qquad (2)$$

In the equation (2) above, z_i, and z_j represent observed deviations from the mean. The summation over j will only include neighbouring values, thus $j \in J_i$. For the simplified interpretation, the spatial weights w_{ij} are mostly in row standardised form, and by convention $w_{ii} = 0$ (Anselin, 1995). The spatial weights were calculated using the queen contiguity method as explained in the previous section, and the same Python language packages and libraries mentioned were utilised in this section.

3. Results and Discussion

3.1 Global assessment of spatial autocorrelation of RLP

The global assessment of spatial dependence of residential land price (RLP) results yielded Moran's $I = 0.83$ and a p-value = 0.001, indicating that the RLPs are significantly clustered. Therefore, we reject the *null* hypothesis (that the Dar es Salaam RLPs are random) and accept the alternative hypothesis, which states that the Dar es Salaam RLPs are spatially clustered. Figure 2(a) (reference distribution) represents the graphical representation of the empirical test used to obtain the p-value. The p-value = 0.001 implies that only 0.1% of random permutations could produce a larger Moran's *I* than the one observed, while 99.9% would result in a smaller Moran's *I*. Hence, the test results are significant.

The significance of our testing results is further confirmed by the Moran Plot [Figure 2(b)]. The red line represents the best linear fit between the normalised RLP variable (Attribute) and the normalised ordinate spatial lag of the RLP variable (Anselin, 1995; Barreca et al., 2018). The obtained Moran's $I = 0.83$ represents the slope of this linear fit, showing the specific spatial arrangement of the RLPs across space and indicating that a large percentage of the values are concentrated along the line. Thus, the global spatial analysis depicts the positive autocorrelation of the RLPs across space.

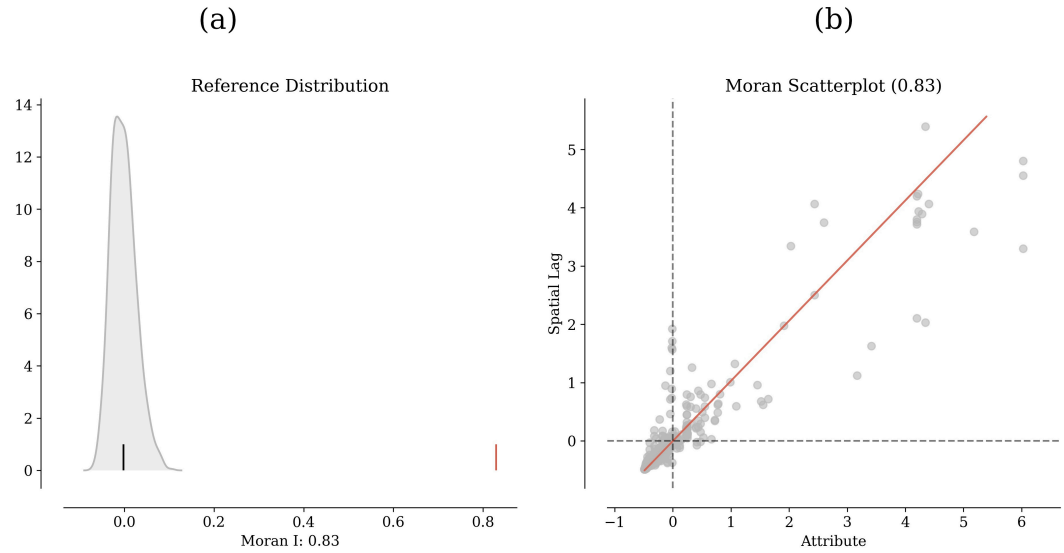

Figure 2: (a) Shows graphical representation of the empirical test and (b) Moran scatter plot showing positive spatial autocorrelation of residential land price in Dar es Salaam.

3.2 Local assessment of spatial autocorrelation of RLP

The local indicators of spatial association (LISA) results are presented in a Moran scatter plot (Figure 3) generated with four descriptive quadrants: High-High (HH), known as hot spots (high prices surrounded by high prices), Low-Low (LL), known as cold spots (low prices surrounded by low prices). Low prices surrounded by high prices are known as Low-High (LH), and high prices surrounded by low prices are known as High-Low (HL), representing the spatial outliers. Colored dots in each quadrant represent statistically significant values at the 5% (p-value < 0.05) level.

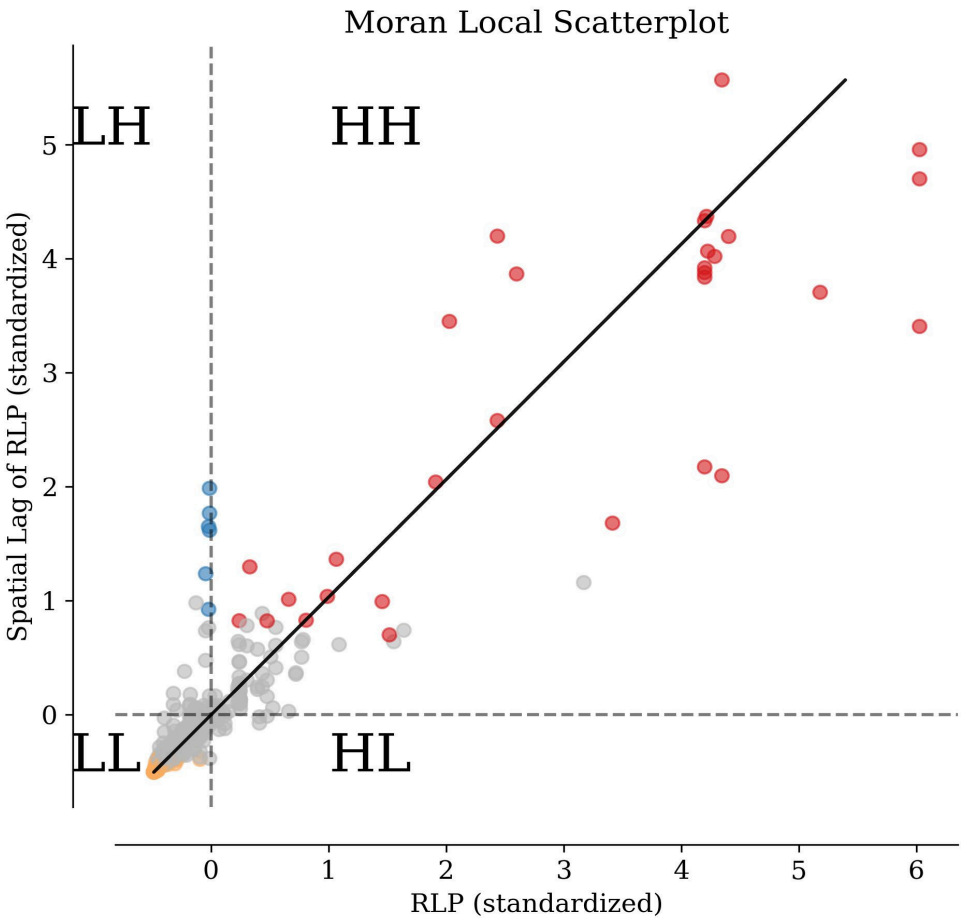

Figure 3: Shows local Moran scatter plot of Dar es Salaam residential land prices with quadrants High-High (HH), Low-Low (LL), Low-High (LH), and High-Low (HL).

From the Moran scatter plot, it is evident that quadrant 1 (Q1), labelled HH and quadrant 3 (Q3), labelled LL, are dominated by a larger number of sub-wards compared to quadrant 2 (Q2), labelled LH and quadrant 4 (Q4), labelled HL. This dominance is further demonstrated by the map in Figure 4(a). The land market is dominated by land prices that are lower than the average, suggesting that the analysed data are right-skewed, as shown by the histogram in Figure 4(b) and the statistical details in Table 1. This skewness aligns with findings from other studies on land price analysis, which demonstrated that land price data tend to be right-skewed and follow non-normal probability distributions such as lognormal (Hu et al., 2013). However, further independent investigation is needed to determine which specific probability distribution best fits the land price data of Dar es Salaam. Moreover, the results could also suggest that the city still follows a monocentric structure.

Additionally, the results could suggest that areas with extremely high prices result from more intensive bidding for space by households with higher incomes. This could be attributed to the availability of important amenities, robust business activity and employment opportunities, easy accessibility, good transport systems, and well-planned land (Alonso, 1960; Brigham, 1965; Grimes and Liang, 2009; Kironde, 2000). However, further independent studies are needed to identify the specific spatial determinants that can better explain the distribution of RLPs in Dar es Salaam.

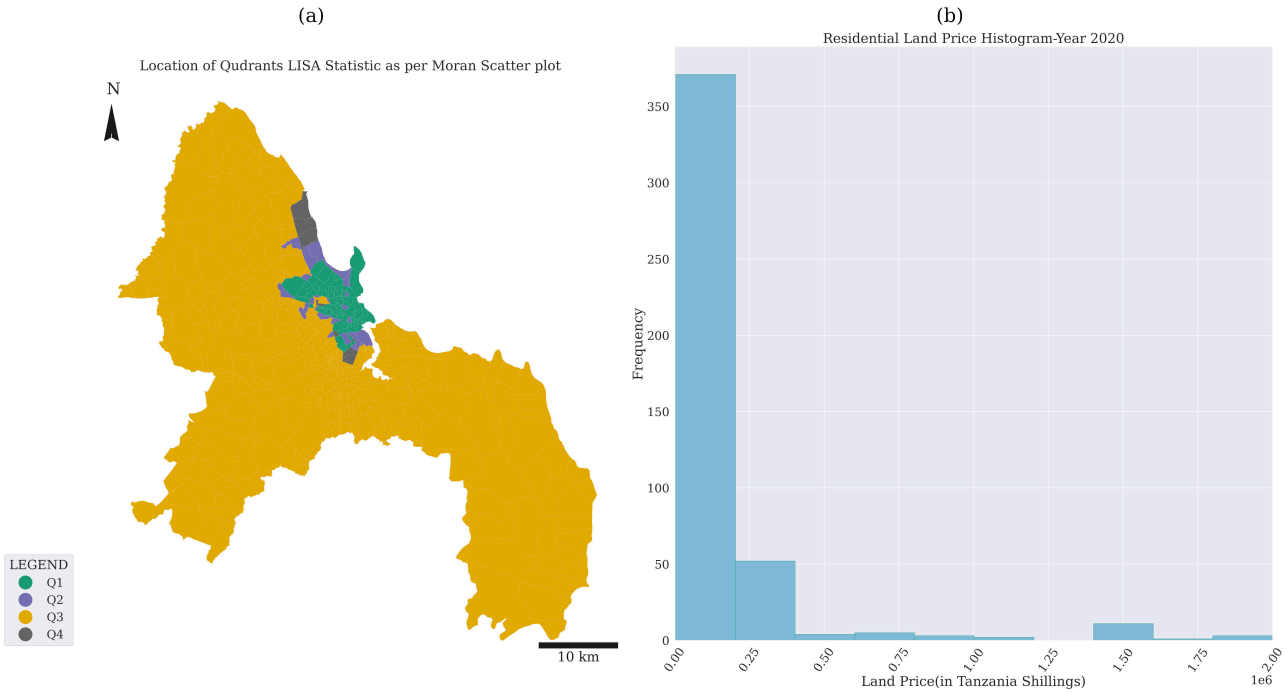

Figure 4: (a) The map shows the location of sub-wards as per local Moran scatter plots quadrants, (b) The histogram shows the frequency of the prices

Considering the significance level for each LISA result with a calculated p-value threshold of 5% (0.05), Figure 5(a) displays the significant and non-significant sub-ward results based on the p-values. Only 159 sub-wards (35%) were found to have significant results, while 293 sub-wards (65%) were deemed non-significant (noise results), as seen in Table 2. Moreover, Figure 5(b) illustrates the sub-wards that are significantly clustered according to the quadrants shown in the local Moran Scatter plot (Figure 3). Specifically, sub-wards characterised by positive local spatial autocorrelation with High-High (HH) land prices show that only 30 out of 88 were significantly clustered, most of which are areas around the city centre (CBD). Similarly, those with positive autocorrelation and Low-Low (LL) land prices show that only 123 out of 327 were significantly clustered, predominantly located on the outskirts of the city.

In addition, sub-wards characterised by negative local spatial autocorrelation (spatial outliers) included only 6 sub-wards out of 27 in the Low-High (LH) price category that were significantly clustered, primarily located not far from the CBD areas. Conversely, all 10 sub-wards categorised as High-Low (HL) with negative autocorrelation results were found to be non-significant (ns). The sub-wards with non-significant p-values begin from areas close to the CBD and extend towards the outskirts of the city with significantly low clustered prices. These results may suggest the presence of socioeconomic services or activities, improved transport, high housing density, and a growing population in those areas. These characteristics progressively decrease and differ as they move further from the CBD towards the outskirts of the city with significantly low-low spatially clustered land prices (Alonso, 1960; Hu et al., 2013). Moreover, these areas are considered metropolitan parts of the city and are characterised by consolidated planned and informal settlements (Three City Land Nexus Research Team, 2020). Furthermore, they contain growing sub-centres [Figure 1(a)] such as Mwenge, Tegeta, Mbezi Beach, Manzese, and Mikocheni (Peter and Yang, 2019), which have evidently contributed to the discrete jumps in RLP as shown in an inset map in Figure 1(b).

Contrarily, those areas with significantly low-low spatially clustered RLP could be regarded as peri-urban areas of the city characterised by socioeconomic challenges such as poor transport infrastructure, social services, and low housing density, as suggested by Wolff et al. (2021). Moreover, these peri-urban areas demonstrated signs of urban sprawl, characterised by low-density development, sparse population, and a significant presence of informal settlements (Bhanjee and Zhang, 2018; Msuya et al., 2021).

Generally, the LISA results might represent the growth and expansion of the land market and the city. The urban land market pattern and city development largely expanded as it moved to the north and west sides from the CBD.

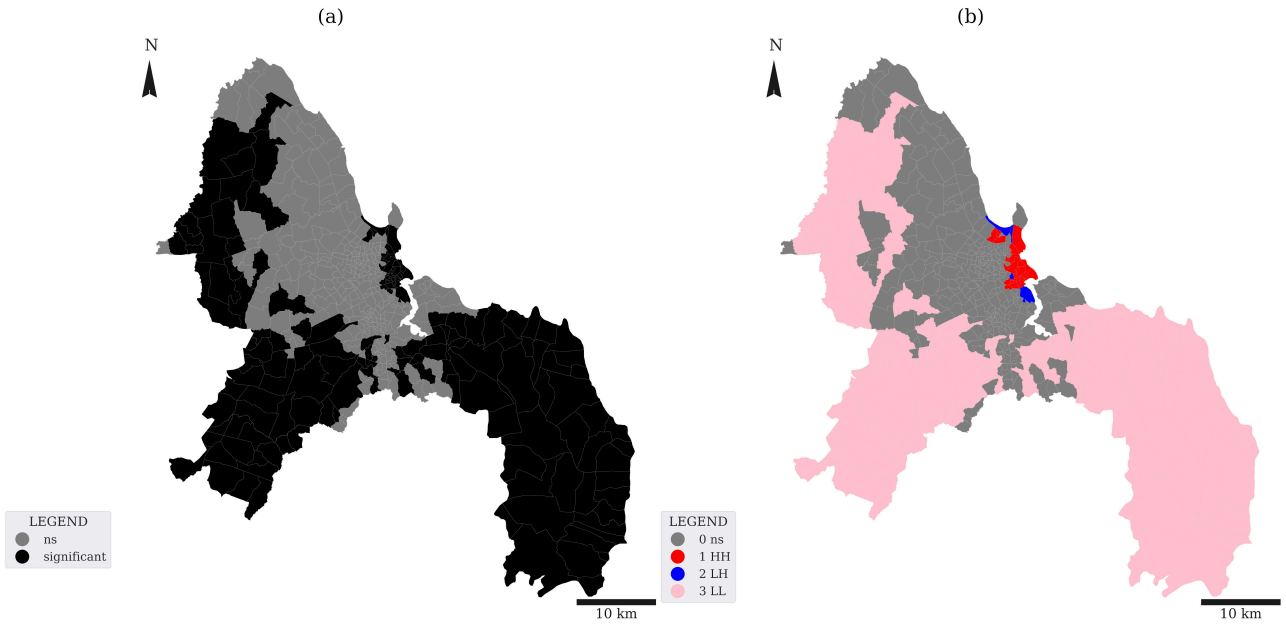

Figure 5: The map (a) shows the sub-wards with significant and non-significant (ns) of local Morans results as per p-value; whilst the map (b) shows significant clustered sub-wards as per quadrants in local moran scatter plot

Table 2: Summary of significant and non-significant LISA's results

	Significant	Not-Significant	Total Number
High-High	30	58	88
Low-High	6	21	27
Low-Low	123	204	327
High-Low	0	10	10
Overall Total Number of sub-wards	**159**	**293**	**452**

4. Conclusion

This study successfully analysed the spatial pattern of RLPs in Dar es Salaam city, Tanzania, at the sub-ward level, capturing their spatial distribution and variation. The study contributes to existing regional and sub-regional literature on land markets, real estate, and urban studies in two key perspectives. Firstly, it reveals the spatial patterns of RLPs in one of Sub-Saharan Africa's fastest-growing cities, which is predominantly characterised by an informal land

market, with over 70% of residents living in informal settlements (Andreasen et al., 2020). Before this study, there was a lack of cartographic resources explaining the spatial auto-correlation of land prices in the city. Secondly, the study examined the dynamics of the land market and urban growth of Dar es Salaam by identifying different local clusters, including areas with high, low, and outlier prices. These findings are then connected to existing literature on urban growth and expansion to enhance understanding of these dynamics.

The study applied and utilised the concepts of GISA and LISA by computing global Moran's *I* and local Moran's *I*, respectively. The global analysis convincingly shows that the RLPs in the city are highly spatially clustered rather than random, thus rejecting the null hypothesis. Meanwhile, LISA results demonstrated that most of the sub-wards with clustered RLPs have prices lower than or below the average. Moreover, LISA results demonstrated that only 35% of the Dar es Salaam sub-wards are statistically significantly clustered, primarily located on the outskirts (peri-urban) with lower prices, while only a small portion is around the CBD areas with higher prices. The other 65% of the city's sub-wards exhibit statistically insignificant clustering (noise), representing areas undergoing continuous socio-economic development, experiencing high demand for land, vibrant land price fluctuations between nearby sub-wards, increased housing density and population, and consolidated planned and informal settlements. Therefore, the LISA results can be used to study the expansion of the city's land markets as well as urban growth.

Generally, global and local Moran's *I* proved to be effective tools for studying the spatial distribution and variation of RLPs in Dar es Salaam city. The results could aid decision-making for land management departments, policymakers, investors, and resource allocation. Moreover, the results could be generalised, and the methodological approach could be extended to other cities in the country and in Sub-Saharan Africa that share similar geographic, socioeconomic, urban growth, and land market characteristics. However, further study is needed to reveal the spatial and temporal factors that drive RLPs in Dar es Salaam.

Acknowledgments

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Declaration of Interest

The authors declare that there are no conflicts of interest.

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Real Estate Development Financing through Pre-letting and Pre-sale Arrangements: An Assessment of Adoption Level in Emerging Markets

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Abstract

Utilisation of pre-letting and pre-sale financing (PPF) arrangements for housing delivery have gained increased attention in the literature. However, the increasing rate of housing deficit in the emerging markets does not represent the reality of an increase in the adoption of PPF arrangements. With the aid of a semi-structured questionnaire, this study examined the level of adoption of PPF arrangements by property development companies (PDC) in the emerging markets. The questionnaires were administered to 87 PDCs in Lagos metropolis to gather property-related data such as the number of property units developed between 2008 and 2023, unit type, number of units pre-let, and number of units pre-sale, among others. With the use of an Excel spreadsheet and SPSS software, the acquired data were analysed using percentages and regression analysis. Findings revealed that the proportion of pre-letting against the total units of property developed during the year under review was 7.48 percent, and pre-sale 17.44 percent. While 67.70 percent of the pre-letting proportion applied to commercial properties,

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53.24 percent of the pre-sale proportion applied to residential properties. An increase in pre-sale adoption was observed throughout the years under consideration. Though a more significant increase was witnessed in the residential properties, commercial properties equally witnessed a slight increase across the years. The regression analysis outcome showed that none of neither pre-letting nor pre-sale financing adoption was significantly influenced by the tested organisational parameters in the study area. It is, however, necessary that the stakeholders pay attention to pre-letting financing arrangements and increase the adoption of both arrangements to improve housing provision.

Keywords: *Pre-letting, Pre-sale, Real estate development, Financing arrangements, Finance adoption*

1. Introduction

Ever-increasing human population coupled with rural-urban migration has, over the years, resulted in high demand for adequate and decent real estate for various purposes. Real estate provides housing for both rural and urban populations, as well as the creation of employment for people in the construction industry. It is a benchmark for the economic growth of any country (Udoka and Kpataene, 2017). According to the World Bank, real estate constitutes a considerable proportion of the world's wealth, accounting for approximately 60% of the total mainstream global assets, 33% of Malaysia's Gross Domestic Product (GDP), 50% of Hong Kong's, 77% of United States of America (USA) and 80% of UK's GDP (Emoh and Nwachukwu, 2011). In Australia, the real estate sector was the largest employer of labour and has contributed immensely to the country's economic output (Rowley et al., 2014). Moreover, in a developing economy such as Nigeria, real estate has equally been viewed as a basic necessity that impacts a country's prosperity and individual productivity (Olaleye et al., 2004).

Despite the valuable contributions of real estate to a human's well-being and overall national economy, its global supply shortage has become a growing concern. In the USA, high-cost cities were the result of housing supply shortage in the face of ever-rising demand (Newell, 2010). This aligns with the economic principle that an increase in demand for a scarce commodity breeds competition that forces an increase in its price. In a similar view, Madichie and Madichie (2016) identified a shortage in Nigeria's real estate supply, which they attributed to the natural increase in rural-urban migration. This ever-increasing demand necessitated the need for adequate financing, which is one of the many uncertainties being faced by real estate development in the emerging markets (Katwa and Obala, 2023).

Finance has been adjudged as the lifeblood of real estate development (Hutchison et al., 2017). Its shortage has made it a subject of scrutiny in some developed countries (Squires et al., 2016). Oyedeji (2018) affirmed that the availability and accessibility of finance are major parameters to be considered in real estate development. The high cost of capital acquisition attributable to some traditional sources of finance has been identified as one of the major factors affecting access to finance and has so far stifled development (Udoka and Kpataene, 2017). Poor access to traditional sources of finance has increased attention on various forms of trust-based innovative financing arrangements. Several of these arrangements, which allow funding based on trust rather than on interest rates, are gaining relevance. Some convert the demand side of the market into the financier of the supply side. In such cases, buyers indirectly provide the needed capital based on trust rather than on interest rates. Examples of these arrangements include ground rents, peer-to-peer lending, crowdfunding, site-and-services schemes, real estate investment trusts (REITS), pre-letting, and pre-sale (Baldwin, 2017; Vanneste, 2022). While there is limited attention on many of these innovative arrangements

in the emerging markets (Lai et al., 2018), pre-letting and pre-sale financing arrangements (PPF) are gaining prominence in the Nigerian real estate development market (Olayiwola et al., 2025).

PPF arrangements have both been examined as mechanisms to guarantee easy access to finance (Olayiwola et al., 2024) and to reduce the cost of capital, among other factors driving their adoption (Olayiwola, 2023). These arrangements have proven suitable for both commercial (Hinkelmann and Swidler, 2008) and residential properties (Edelstein and Liu, 2016). Also, both arrangements have been used to effectively address housing shortage in developed economies (Edelstein et al., 2012; Li and Chau, 2019), contributing to the improvement of property markets in China (Deng and Liu, 2009) and Canada (Choi et al., 2012). Leung and Hui (2005) observed that the positive impact of these financing arrangements on property market performance motivated an increase in their adoption from 49% in 1995 to 86% in 2001. While there are studies on the challenges and prospects of forward sale arrangements (Oloke et al., 2017) and housing provision strategies (Shiyanbola & Olaleye, 2022) and factors influencing the adoption of PPF (Olayiwola et al., 2025), a paucity of studies exists on the extent of their adoption in emerging markets such as Nigeria. Accordingly, this study examined the level of adoption of PPF arrangements among property development companies in the Lagos metropolis, as well as the influence of the development companies on the level of adoption.

2. Literature Review

This section provides information on the level of adoption of PPF arrangements as tools for real estate development finance. The section is grouped into the following sub-sections: real estate development and finance, PPF arrangements, benefits of PPF arrangements and level of adoption of PPF arrangements.

2.1 Real Estate Development and Finance

Despite the indispensable role of real estate in human welfare and national economic development, inadequate access to finance has remained its main setback. The poor quality and limited quantity of real estate developments could sometimes be traced to weak and ineffective financing mechanisms (Emoh and Nwachukwu, 2011). van Donge (2012) succinctly categorised real estate development challenges into two: land ownership and management, and finance. UN (2012) identified finance as one of the critical global challenges to development, alongside good governance. Olayiwola (2023) further emphasised that real estate development finance is a fundamental centrepiece and an essential real estate development. The role of finance in development is significant to the successful implementation of any progressive investment and development exercise. van Donge (2012) conducted a comparative analysis of the Kenyan and Malaysian development trajectories from 1980 to 1994. The findings revealed stagnation in the Kenyan case and sustained growth in the case of Malaysia, despite a similarity in governance indicators for both countries. The difference in growth outcomes between the two countries was attributed to access to finance.

In spite of increasing efforts to make finance accessible, real estate development firms still encounter problems in securing funds for projects, chief among them is the high cost of capital acquisition. The global financial crisis of 2007–2008 brought real estate finance under heightened scrutiny (Squires et al., 2016), revealing the inadequacy of conventional financing arrangements and raising interest in innovative forms of real estate development financing. Baldwin (2017) identified six innovative arrangements which are predominantly being utilised in the property market globally: forward funding, unitisation, ground rents, crowdfunding and

fund pooling. Added to this list are public-private partnership, turnkey, presale (off-sale), pre-letting, shell stage, and site-and-service schemes (Tabatabai, 2016; Hutchison et al., 2017; Shiyanbola and Olaleye, 2022).

2.2 Pre-letting and Pre-sale Financing Arrangements

A pre-letting arrangement is a lease contract between a lessee and a lessor in which rent is paid in advance for a yet-to-be-built or uncompleted property (Edelstein and Liu, 2016), whereas pre-sale financing describes the outright sale of a proposed or uncompleted property to a buyer who awaits asset completion (Wilkinson and Reed, 2008). It has been examined as an arrangement used to transfer proposed real estate development from developers to lessees or buyers in exchange for money (Leung and Hui, 2005; Oloke et al., 2017). It is a sale contract transferring ownership rights at a future date, but with immediate financial commitment, between a developer and a buyer. Both have been used synonymously as off-plan transactions and as a form of innovative real estate finance arrangements in both residential and commercial real estate development (Olayiwola et al., 2023). They have become vital real estate delivery strategies currently considered by stakeholders in the industry (Alqahtany et al., 2023).

2.3 Benefits of Pre-letting and Pre-sale Financing

A significant relationship has been identified between the benefits conferred by pre-letting and pre-sale financing and their adoption by real estate development firms (Fisher, 2010; Edelstein and Liu, 2016). These benefits have inspired the consistent adoption of the financing arrangements in many developed economies, especially in the UK, Asia and Europe (Fisher, 2010; Choi et al., 2012; Kieu and Mogaji, 2018). In the emerging markets, the inherent advantages of PPF– include ease of raising needed capital for real estate development and reduction of capital cost burden on the property development companies have influenced the increase in adoption (Olayiwola et al., 2025). The arrangements have been discussed to effectively help in the project pre-assessment, aid loan accessibility, and eliminate costs. Alqahtany et al. (2023) noted that PPF encouraged the acquisition of real estate at a reduced cost as to the built-to-sell units. Hua et al. (2001) asserted that PPF arrangements have been employed to share development risk and raise finance, which serves as a take-off fund for the real estate development firms (Katwa and Obala, 2023). The arrangements also eliminate costs that are associated with spot properties (Lai et al., 2004), and examine the market performance of proposed development (Edelstein et al., 2012). They have been considered as hedging tools because they keep both development firms and lessees or buyers at a better advantage than the case of spot or existing properties (Bessembinder and Lemmon, 2002; Djenic et al., 2012; Fabozzi et al., 2020).

Both the supply side (the real estate firm) as well as the demand side (buyers) of the market benefit from these arrangements. Their market acceptability appears to have been hinged on the benefits they confer. Unlike the spot property arrangement, which necessitates a payment of a lump sum, the buyers who constitute the demand side are allowed to pay on an instalment basis under the pre-letting and pre-sale financing arrangements. The mode of instalment payment is usually based on the agreement between the development firms, and this is clearly stated in the contract terms and conditions (Olayiwola, 2022). According to Leung et al. (2007), investors are presented with the option of either paying an initial deposit while the balance is paid as a lump sum at project completion or in instalments as the case may demand.

This pre-letting and pre-sale technique makes property financing for an investor, such as an average buyer, an easy task.

Moreover, Proskurovska and Dörry (2022) positioned that it equally reduces future housing search costs and legal costs, such as transaction costs. Their study argued that all pre-letting and pre-sale financed property transaction enjoys exemption from transaction tax, otherwise known as capital gain tax payable to the government on every registered property until after the completion. This exemption is because the property has not yet been officially registered. This indicates more savings on the part of the lessees or buyers. Hua et al. (2001) identified that pre-letting and pre-sale financing arrangements provide an opportunity to critically assess property sales performance long before commitment of funds to its development. They accord the privilege of pre-determining market responses to a project well before construction. This is a form of market study, which is a part of feasibility and viability studies for a proposed project. Unlike spot property, which may suffer from void if it fails the market acceptability test, pre-letting and pre-sale financed property can easily be converted since it is still in the planning stage. These arrangements aim to help reduce or eliminate the problem of void after construction in the Nigerian property industry. Development firms can use it to test market demand. Once the impossibility of demand is envisaged, the property design can quickly be changed to suit the market demand or otherwise cancel such proposed development.

The arrangements assist the development firm in solving the market uncertainty problem since the time of sale is almost the same as the time of investment decision making (Leung and Hui, 2005). The increasing attention on the arrangements appeared to relate to their distinctive ability to mitigate uncertainty arising from a potential drop in the future price of property. They enable developers to transfer property at a fixed price, which, by contract, is not affected by future downturns or upturns in the property's value. This also serves as a hedge against any financial loss that may likely arise from the unsold property in the event of any fall in price by the completion time (Edelstein et al., 2012). Choi et al. (2012) opined that pre-letting and pre-sale financing arrangements give developers a higher chance of securing loans for development. Evidence of sales for a stipulated number of units in a proposed development reduces uncertainty and encourages financial institutions to commit funds to the project, as is commonly seen in the USA (Edelstein et al., 2012). The study added that pre-letting and pre-sale financing aid developers in securing buyers for the proposed projects, thereby assuring sales. This approach eliminates the void period by ensuring that a substantial number of units in the development are occupied before the completion (Chang and Ward, 1993).

The demand side of the market becomes the source of funding for the supply side, easing the financial burden on the development firms. Hua et al. (2001) opined that the arrangements are effective for mobilising funds for real estate development, especially in the face of financial constraints. Since the property is sold before construction, the money raised from prospective owners is ploughed into the development. This enhances firms' financial viability when large-scale development of real estate is involved (Leung and Hui, 2005), and in the case of smaller projects, the excess funds can be gathered for investment in some other projects with higher returns (Leung et al., 2007). Pre-letting and pre-sale financing arrangements transfer both risk and financial responsibility to the house lessees or buyers. They saddle lessees or buyers with the responsibility of financing these developments through either equity or bank loans. A certain percentage is deposited before the signing of the Sales and Purchase Agreement, while the balance is paid upon completion of the development (Ibrahim et al., 2015). Pre-letting and pre-sale financing arrangements appear to be a reliable solution to the current financial problems hampering the performance of the real estate development sector in Nigeria if

properly utilised. As a “risk-reducing” tool (Djenic et al., 2012), the concerns of development firms on major development risks will be reduced.

Lai et al. (2004) identified that pre-letting and pre-sale financing arrangements help to eliminate marketing costs and inventory costs, which are inevitable in the case of spot or existing properties. They argued that because pre-letting and pre-sale financed properties are yet to be developed, marketing and inventory costs are effectively eliminated. While this study agrees with Lai et al. (2004)'s view on the elimination of inventory costs, it differs on the elimination of marketing costs. A pre-letting or pre-sale financed property must still be advertised to attract potential buyers for the proposed development. Therefore, marketing and advertising costs will still be incurred. However, maintenance costs will be eliminated since it is a proposed development and not a spot property.

Pre-letting and pre-sale financing arrangements are trust-based financing approaches, substituting interest payments with integrity (Kieu and Mogaji, 2018). Unlike a completed development, also known as a spot property, which affords the privilege of inspection and verification of property quality. The lessees or buyers of pre-letting and pre-sale financed properties only buy based on their trust in the information provided by the developer during the advertisement of the proposed development. The properties are presented to lessees or buyers through computer-generated images, providing a view of what the property will look like after completion, assuming there is no alteration in the design. The lessees or buyers may agree to accept the development as revealed on the developer’s plan or make a request for alteration to suit their specific needs (Edelstein, 2012). For developers, this is an advantage in overcoming high interest rates that constrain performance in the development industry.

Chang and Ward (1993) identified that pre-letting and pre-sale financing enhance property market efficiency, and confer on developers the benefits of loss minimisation and profit maximisation. In the 1980s, pre-letting and pre-sale financing were used to transform Taiwan’s property sector, enabling 80 per cent of owner-occupied properties to be developed despite difficulties in accessing capital from the formal sector. The study further discussed that the arrangement allows developers to minimise losses inherent in spot properties due to post-construction voids, as well as a loss inherent in pre-letting and pre-sale financing due to a lack of opportunity to participate in future price appreciation. Pre-letting and pre-sale financing allow developers to adopt a portfolio-based property sales approach. According to Chang and Ward (1993), the portfolio-based property sales approach involves dividing the entire development into three stages: one is sold at the planning stage, another at the construction stage, while the remaining is disposed of at the completion stage. This strategy enables developers to minimise losses and maximise profits.

From the aforementioned, pre-letting and pre-sale financing are suggested to be suitable arrangements capable of reducing or eliminating the current challenges encountered in real estate development finance. It is an interest-free financing option and provides a guarantee-free access to the finance needed for real estate development. Its ability to substitute trust for interest payments serves as a competitive advantage for development firms, especially in countries like Nigeria, where the problem of high interest rates has become a persistent challenge. However, all of the studies reviewed are based on foreign contexts rather than Nigeria. Hence, it is necessary to test these factors within the study area to identify how the factors motivate the adoption of pre-letting and pre-sale financing in real estate development firms. It is also important to examine if any of the firms’ characteristics, such as firm size, financial strength and experience, mediate the level of adoption of these financing arrangements.

2.4 Level of Adoption of Pre-letting and Pre-sale Financing Arrangements

Studies have revealed an increasing level of adoption of pre-letting and pre-sale financing arrangements for commercial and residential property transactions in many developed countries over the years. Edelstein et al. (2012) noted that for several decades, these arrangements have been employed in many Asian countries such as Hong Kong, China, Singapore, Korea and Taiwan, as well as in the USA. In addition, Leung and Hui (2005) reported their application in Malaysia, London, Toronto and Beijing. According to Leung and Hui, the ratio of pre-letting and pre-sale financing arrangements in Hong Kong, which is regarded as a pioneer user that increased from 49% in 1995 to as high as 86% in 2001.

To assess the level of adoption, Shiyanbola and Olaleye (2022) examined the frequency of use of each housing provision strategy. The study asked respondents to indicate how frequently housing strategies were used in practice by development firms in Lagos metropolis over thirteen years. The study found that pre-letting and pre-sale were among the most employed strategies for housing delivery by developers. Similarly, Oloke et al. (2017) measured developers' preference for project financing techniques by requesting them to rank a list of available options. The study identified forward sale as one of the project financing methods that received a high level of preference. However, both studies lack data on the type of property for which these arrangements were adopted. Also, none of the studies investigated property-specific data. Using property-specific data will eliminate bias and provide clear information that will guide the development firms' decision-making processes on the particular property type that attracts buyers' attention when pre-letting and pre-sale financing arrangements are employed. Hence, this study examined the level of adoption of pre-letting and pre-sale financing arrangements across different property types using property-specific data. It also measured the influence of a firm's profile on the level of adoption.

3. Methodology

Primary data was collected from the property development companies (PDC) in Lagos metropolis using a semi-structured questionnaire. A total enumeration of the 87 PDCs in the study area was carried out for this quantitative research. The questionnaire was administered to a senior staff member from each of the 87 PDCs in the study area. Data such as the profile of the firm, the yearly number of properties developed from 2008 to 2023 and the yearly number of properties developed using pre-letting and pre-sale financing arrangements during the period were collected. The figures were acquired based on the property types (residential, commercial and others). In addition, the firms were asked to rate, on a scale of 1 to 7 (where 1 = not adopted and 7 = highly adopted), the level of adoption of pre-letting and pre-sale arrangements. The study took the middle point as the minimum benchmark for a good level of usage. The data was analysed using frequency distribution, percentage and regression analysis. The field survey was personally conducted.

The study disaggregated the adoption into pre-letting, pre-sale and others. That is,

$$\text{TUD} = \sum TP_L, TP_s, Others \quad \text{-------- (1)}$$

Where:

TUD is Total number of property units developed;
TP_L is the Total number of Pre-let units;
TP_S is Total number of Pre-sold units; and

Others refer to property developed through other means of financing.

Total pre-letting and pre-sale was calculated as the summation of residential and commercial units pre-let and pre-sold across the development firms during the year under review. This could be depicted as shown in equations (2) and (3).

$$TP_L = \sum RUP_L, CUP_L \quad \text{-------- (2)}$$
$$TP_S = \sum RUP_S, CUP_S \quad \text{-------- (3)}$$

Where:

TP_L is Total number of Pre-let units;
RUP_L is Residential Unit Pre-let;
CUP_L is Commercial Unit Pre-let;
TP_S is Total number of Pre-sold units;
RUP_S is Residential Unit Pre-sold; and
CUP_S is Commercial Unit Pre-sold.

To determine the total number of real estate development financed through pre-letting and pre-sale arrangements, the summation of equation (2) and (3) was taken as shown in equation (4).

$$APP = \sum TP_L, TP_S \quad \text{-------- (4)}$$

Where:

APP is the Aggregate of property units Pre-let and Pre-sold.

In order to accurately calculate the rate or level of adoption of pre-letting and pre-sale financing arrangements equations (5), (6), and (7) were employed. For the percentage change in TP_L, TP_S and APP, each was evaluated against TUD.

$$\Delta TP_L = TP_L/TUD \quad \text{-------- (5)}$$
$$\Delta TP_S = TP_S/TUD \quad \text{-------- (6)}$$
$$\Delta APP = APP/TUD \quad \text{-------- (7)}$$

Furthermore, the relationship between the level of adoption of pre-letting and pre-sale arrangements was tested using regression equations (8) and (9)

$$P_L = C + \beta x^0 + \beta x^1 + \beta x^2 + \beta x^3 \quad \text{-------- (8)}$$
$$P_S = C + \beta x^0 + \beta x^1 + \beta x^2 + \beta x^3 \quad \text{-------- (9)}$$

The study also employed regression analysis to determine the relationship between the adoption of pre-letting and pre-sale financing arrangements and the organisational parameters such as age of the firm, staff strength, asset base and ownership types. The outcome variable for the regression analysis was the levels of pre-sale and pre-letting adoption, while the predictors were the real estate development firms' characteristics, such as years of establishment, type of ownership, staff strength, and asset base. At a 95% degree of confidence ($p = 0.05$), the Durbin-Watson test of autocorrelation for both pre-sale and pre-letting is approximately 2, respectively, as shown in Table 5. This implies that no assumption of linear regression is broken. The closeness of both Tolerance and Variance Inflation Factor of both arrangements to 1 suggested a low level of collinearity. Hence, the available information is suitable for linear regression analysis.

3.1 Reliability and Validity Tests

The reliability and validity of the instrument were established through expert review (done through administration of a pre-test questionnaire) and Fleiss' Kappa. The experts were

purposively selected and comprised five academic members and two practitioners. The corrections, as observed by each expert, were implemented, and the instrument was resubmitted for approval before its administration. Post administration of the instrument was assessed independently by a professional data analyst for data consistency, outliers and cross-validation within responses. To test the internal consistency of the acquired data, the categorical data were assessed using Fleiss' Kappa (McHugh, 2012) at a 95% confidence interval. The Fleiss' Kappa for the categorical independent variables was 0.547, indicating a moderate and reliable level of agreement between the responses on organisational parameters (Landis & Koch, 1977). At p-value 0.002, the outcome revealed that the agreement is not due to chance but a real effect.

4. Findings and Discussion of Results

The level of adoption of pre-letting and pre-sale financing in the surveyed firms was analysed using percentages of property-specific data. The section gives details of the real estate development firms' profiles, the characteristics of the respondents, and finally, the level of adoption of pre-letting and pre-sale financing arrangements.

4.1 Profile of Firms

Table 1 Profile of Real Estate Development Firms

Profile		Frequency	Percentage (%)
Year of Establishment	Up to 5	17	19.5
	6 – 10	22	25.7
	11 – 15	25	28.7
	16 – 20	13	14.9
	21 – 25	4	4.6
	Above 25	6	6.9
	Total	**87**	**100.0**
Ownership Type	Sole Proprietorship	27	31.0
	Partnership	8	9.2
	Joint Venture	3	3.4
	Limited Liability Company	49	56.3
	Total	**87**	**100.0**
Asset Base	Up to $555,000	25	28.7
	$555,001 – $1.1 million	15	17.2
	$1.11 million – $1.6 million	14	16.1
	$1.61 million – $2.2 million	12	13.8
	$2.21 million and Above	21	24.1
	Total	**87**	**100.0**
Staff Strength	Up to 5	13	14.9
	6 – 10	15	17.2
	11 – 15	13	14.9
	16 – 20	6	6.9
	21 – 25	5	5.7
	Above 25	35	40.2
	Total	**87**	**100.0**

Exchange Rate of $1 = ₦450 (CBN, 22nd April, 2022)

As presented in Table 1, the profile of the firm was examined using different parameters such as year of establishment, ownership type, asset base, and staff strength. These parameters were analysed using frequency distribution and percentages. The analysis revealed that 55.1 percent of the surveyed real estate development firms have been in existence for more than 10 years, with 67.7 percent of the firms having more than 10 members of staff. It was equally revealed that 13.8 percent of these firms were being operated as limited liability companies, with 28.7 percent as sole proprietorships. This indicates that the surveyed firms have, over the years, developed a good capacity for effective operation of real estate development. This has got them engaged in several real estate development exercises that have translated to an increase in their asset base. As shown in Table 1, 71.2 percent of the firms have an asset base of over five hundred and fifty-five thousand USD naira ($555,000).

4.2 Characteristics of Respondents

Table 2 Profile of Respondents for the firms

Profile		Frequency	Percentage (%)
Gender	Male	66	75.9
	Female	21	24.1
	Total	**87**	**100.0**
Highest Education	HND	19	21.8
	B.Sc.	43	49.4
	M.Sc.	23	26.4
	Ph.D	2	2.3
	Total	**87**	**100.0**
Years of Experience in Real Estate Development	Up to 5	19	21.8
	6 – 10	17	19.5
	11 – 15	27	31.2
	16 – 20	19	21.8
	21 – 25	5	5.7
	Total	**87**	**100.0**
Professional Qualification	NIESV	29	33.3
	NIOB	12	13.8
	NSE	4	4.6
	NIQS	11	12.6
	NIA	5	5.7
	Others[1]	15	17.2
	No Response	11	12.6
	Total	**87**	**100**
Position	Managing Director	8	9.2
	General Manager	15	17.2
	Project/Property Manager	41	47.1
	Public Relations Officer	3	3.4
	Others[2]	20	23.0
	Total	**87**	**100.0**

Others[1] *– this constituted 1 CIBN – the Chartered Institute of Bankers of Nigeria, 3 NIM – the Nigerian Institute of Management, 1 CIPM – the Chartered Institute of Personnel Management of Nigeria, 6 PMI – Project Management Institute.*

***Others*[2] –** *this constituted 4 – Facility Manager, 7 – Estate Surveyors, 1 – Associate Partner, 1 – Admin Manager, 5 – Head of Agency and Management, 1 – Marketing/Research Officer, 1 – Business Development Executive.*

Analysis in Table 2 revealed that 75.9 percent of the respondents were male and 24.1 percent were female. The predominance of males in the senior cadre of the firms could be attributed to the demanding nature of tasks involved in real estate development. Analysis of the respondents' educational background revealed that all were educated with a minimum of an HND degree. This suggests that the respondents were sufficiently knowledgeable to read, understand and give sound judgment on each of the questions raised in the questionnaire. Additionally, the analysis revealed that 58.7 percent of the respondents had at least 10 years of work experience in real estate development, and their opinions were therefore considered valid.

The respondents' professional qualifications varied across different professional bodies. However, a larger percentage were from the built environment, making their responses reliable. Prominent among these were members of the Nigerian Institution of Estate Surveyors and Valuers, which constituted 33.3 percent of the respondents, members of the Nigerian Institute of Building and Nigerian Institute of Quantity Surveyors, which constituted 13.8 and 12.6 percent respectively. Other respondents belonged to professional bodies such as the Nigerian Society of Engineers, Nigerian Institute of Architects, Chartered Institute of Bankers of Nigeria, the Nigerian Institute of Management, the Chartered Institute of Personnel Management of Nigeria, the Institute of Chartered Accountants of Nigeria, and the Project Management Institute.

Furthermore, it was noted that 9.2 percent of the respondents were managing directors, 17.2 percent were general managers, 47.1 percent were either project or property managers, and 3.4 percent were public relations officers of their firms. The remaining 22.8 percent included other positions such as accountant, data processing officer, facility manager, human capital manager, estate surveyors, associate partner, admin manager, head of agency and management, marketing/research officer, business development executive, and secretary. Moreover, Table 2 indicated that 73.3 percent of the respondents (an aggregate of managing directors, general managers and project/property managers) who completed the questionnaire were senior staff members, and possessed accurate and vital details on the practice of real estate development in their respective firms. This validates the adequacy and accuracy of acquired data.

4.3 Level of Adoption of Pre-letting and Pre-sale Financing

For clearer identification of the level of adoption, this study allowed each development firm to rate its level of usage of each arrangement and property-related data. It was then equally analysed as shown in sub-sections 4.3.1 and 4.3.2, respectively. Furthermore, this study tested the relationship between the level of adoption and the firms' profile, and the level of adoption of pre-letting and pre-sale financing arrangements using factor analysis and mean rating.

5. Level of Adoption of Pre-letting and Pre-sale Financing Arrangements

Considering the ratings of 4 to 7 as the range indicating high levels of use, only 18.3 percent and 57.3 percent of the respondents (the summation of scale 4 to 7) showed good usage of pre-letting and pre-sale financing, respectively. Similar to the findings of Shiyanbola and Olaleye (2022), who noted that pre-letting and pre-sale had been adopted by the developers as one of

the methods for housing delivery, the results presented in Table 3 confirmed the adoption of both arrangements. However, the preference for pre-sale was higher than that for pre-letting. This could be because many real estate development firms prefer selling properties outright after every development, rather than engaging in management and maintenance thereafter. In addition, the fact that 54.0 percent of the respondents had never used pre-letting further indicates a lack of interest in the build-to-rent model.

Table 3 Level of Adoption of Pre-letting and Pre-sale Financing

Pre-letting and Presale Financing		Frequency	Percentage (%)
Pre-letting (Rated on scale 1 to 7)	1.00	47	54.0
	2.00	20	23.0
	3.00	4	4.6
	4.00	9	10.3
	5.00	6	6.9
	6.00	--	--
	7.00	1	1.1
	Total	**87**	**100.0**
	Mean	**2.0**	
	SD	**1.4**	
Pre-sale (Rated on scale 1 to 7)	1.00	11	12.6
	2.00	15	17.2
	3.00	11	12.6
	4.00	13	14.9
	5.00	21	24.1
	6.00	9	10.3
	7.00	7	8.0
	Total	**87**	**100.0**
	Mean	**3.9**	
	SD	**1.8**	

SD = Standard Deviation

From the aforementioned, it is evident that the two financing arrangements are not new in the real estate development industry. The arrangements, referred to as off-plan in the industry, are widely known, except for a few respondents, constituting 2.0 percent reported being unaware of them. This small group likely comprises of secretarial staff who have little or no detailed understanding of the arrangements.

6. Level of Adoption of Pre-letting and Pre-sale Financing Arrangements Using Property Related Data

For further analysis of the rate of pre-letting and pre-sale adoption, data on past real estate developments were collected per firm from the year 2008 to 2023. The data were analysed using percentages, and the results are presented in Table 4. The results revealed that the arrangements were used for both commercial and residential properties, which affirmed the work of Hinkelmann and Swidler (2008) and Edelstein and Liu (2016), who noted the application of pre-letting and pre-sale financing arrangements in the property in the USA property market.

According to Table 4, which was calculated using equations 1 to 6 as explained in the methodology section, a total of 12,043 real estate units were developed within the year under

review by the respondents. The analysis revealed that 7.48 percent of the total output was pre-let during the year under review. This corroborates the outcomes in Table 3 regarding the low level of adoption of pre-letting finance arrangements by the development firms. As noted earlier, this could be due to the firms' lack of interest in management and maintenance of real estate. The results also show that 65.08 percent of pre-let units were commercial properties. This implies that properties such as office and shop units were the most transacted using the pre-letting finance arrangement.

In contrast to the pre-letting arrangement, pre-sale had a higher adoption rate of 17.44 percent. However, this level of adoption is low when compared to the number of units financed through other means, such as equity and mortgage, which accounted for 75.08 percent of the total output. As previously mentioned, the higher acceptance rate of pre-sale over pre-letting could be because most of the real estate development firms were interested in the outright sale of their developments. They often focus on the acquisition of bare land, its development and disposal. While commercial properties were the most pre-let units at 67.70 percent, residential properties took the lead with 51.20 percent in pre-sale.

Table 4 Rate of Pre-letting and Pre-sale Adoption

Year	Pre-letting			Pre-sale			Aggregates			Percentage
	RUP_L	CUP_L	TP_L	RUP_S	CUP_S	TP_S	APP	Others	TUD	Δ(APP, TUD)
2008	15	12	27	38	39	77	104	732	836	**12.44**
2009	16	12	28	44	14	58	86	681	767	**11.21**
2010	12	13	25	51	16	67	92	1,190	1,282	**7.18**
2011	19	16	35	56	112	168	203	854	1,057	**19.21**
2012	13	20	33	60	173	233	266	834	1,100	**24.18**
2013	21	23	44	47	57	104	148	235	383	**38.64**
2014	24	28	52	48	125	173	225	531	756	**29.76**
2015	21	32	53	78	202	280	333	464	797	**41.78**
2016	15	39	54	67	21	88	142	877	1,019	**13.94**
2017	21	48	69	74	19	93	162	349	511	**31.70**
2018	21	40	61	105	17	122	183	215	398	**45.98**
2019	14	45	59	79	27	106	165	331	496	**33.27**
2020	21	53	74	91	21	112	186	267	453	**41.06**
2021	17	85	102	99	50	149	251	495	746	**33.65**
2022	19	71	90	87	42	129	219	479	698	**31.38**
2023	22	73	95	94	47	141	236	508	744	**31.72**
Total	**291**	**610**	**901**	**1,118**	**982**	**2,100**	**3,001**	**9,042**	**12,043**	**24.92**
Percentage	**32.30**	**67.70**	**100.00**	**53.24**	**46.76**	**100.00**	**24.92**	**75.08**	**100.00**	
$\Delta(TP_L, TP_S)$	$\Delta TP_L = TP_L/TUD = \underline{7.48}$			$\Delta TP_S = TP_S/TUD = \underline{17.44}$						

RUP_L = Residential Units Pre-let; CUP_L = Commercial Units Pre-let; TP_L = Total Pre-letting;
RUP_S = Residential Units Pre-sold; CUP_S = Commercial Units Pre-sold; TP_S = Total Pre-sale;
APP = Aggregate of Pre-let and Pre-sale financed development (summation of TP_L and TP_S);
TUD = Total Number of Units Developed; Percentage = Rate of APP against the TUD;
Others refer to real estate development units financed through other means, such as equity, mortgage, etc.

In addition, the finding aligns with the observation of Li and Chau (2019), who affirmed an increase in the adoption of the arrangements in the Hong Kong market. Similarly, there was a relative increase in the usage of pre-letting and pre-sale financing arrangements by the real estate development firms in the Lagos metropolis within the years under consideration. As presented in Table 4, there is a steady increase in the adoption of pre-letting and pre-sale finance arrangements in the Nigerian real estate development market. The table shows a percentage change of 12.44 in 2008, which grew to 31.72 in 2021. Although there were sharp declines in 2010 and 2016, the growth suggests a renewed adoption by the firms due to the

inherent benefits of the financing arrangements. The decrease in 2016 might have been due to the economic recession in Nigeria that spanned from 2016 to the first quarter of 2017. Similarly, the slight decline from 2021 might be the aftermath of the COVID-19 pandemic in 2020 and the subsequent cash crunch.

7. Relationship Between Level of Adoption and Firms' Profile

This study further sought to determine whether firms' profiles – such as years of establishment, staff strength, asset base and ownership type – influenced the level of adoption, using multiple regression analysis. Following simple principles of regression analysis – which involve one continuous dependent variable, two or more continuous or categorical independent variables, and the existence of a linear relationship between them (Gogtay et al., 2017) – the findings of this study's multiple regression analysis are illustrated in Table 5. The Durbin-Watson test of reliability for both pre-sale and pre-letting models is approximately 2, indicating that there is no autocorrelation in the models. This implies that the observations are independent of one another. Hence, the independent variables are good predictors for the level of pre-letting and pre-sale adoption in the emerging markets (Adhikari, 2022).

Table 5 Relationship between Firms' Profile and Pre-letting and Pre-sale Adoption

Model	R	R^2	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Pre-letting	0.241[a]	0.058	0.019	1.347	1.989
Pre-sale	0.298[a]	0.089	0.051	1.750	2.054

a. Predictors: (Constant), Asset Base, Ownership Structure, Staff Strength and Year of Establishment
Dependent Variable: Pre-letting, Pre-sale

Regression equations for Table 5 are presented in equations (1) and (2). Both revealed insignificant contributions of the four tested firm profile variables on pre-letting and pre-sale financing, respectively. The equations confirmed that none of the four variables tested significantly motivates real estate development firms' adoption.

$$P_L = 2.876 - 0.090YE - 0.102OS + 0.021SS - 0.094AB \quad \ldots\ldots (1)$$

$$P_S = 4.975 + 0.119YE - 0.044OS - 0.263SS - 0.108AB \quad \ldots\ldots (2)$$

Where:

P_L means Pre-letting.
P_S means Pre-sale.
YE is the Year of.Establishment;
OS is Ownership Structure.
SS is Staff Strength; and
AB is Asset Base.

Table 5 revealed that there is a low degree of correlation between firms' profiles and both pre-letting and pre-sale, with *R = 0.238 and 0.315,* respectively. Based on the R^2, only 5.7 and 10.0 percent of the total variation in pre-letting and pre-sale adoption (dependent variables) could be explained by the year of establishment, staff strength, asset base and ownership structure (independent variables). This indicates that the factors motivating real estate development firms in the adoption of pre-letting and pre-sale financing arrangements extend beyond the four tested parameters. This finding is in tandem with Ibrahim et al. (2015) and Kieu and Mogaji (2018), who identified the benefits inherent in the arrangements as the key motivating factors for their adoption.

8. Conclusion

The analysis demonstrated that pre-letting and pre-sale financing arrangements are not new to the real estate development firms in Nigeria. When applied to both commercial and residential properties, their level of adoption varied. Furthermore, it showed that the majority of the development firms do not consider pre-letting in their choice of finance for real estate projects. The increasing adoption levels of both arrangements were not significantly influenced by the tested organisational parameters. The increase could be attributed to other factors, within the organisation or outside of the firm's profile. Unlike residential properties, the analysis showed a significant increase in the adoption of pre-letting for commercial properties. However, an increase in pre-sale adoption was seen throughout the years under consideration. Though a more significant increase was recorded in the residential properties, commercial properties equally experienced a slight increase over the years. On the aggregate level, there appeared to be an increase in the adoption of both arrangements for real estate development in Nigeria. However, more can still be done to encourage higher usage of these arrangements. It is necessary that all stakeholders get involved to ensure a smoother and broader adoption of pre-letting and pre-sale financing arrangements. By doing so, it enhances the improvement in housing provision as experienced in developed economies where they have been adopted.

This study adds to the existing body of knowledge by showing the increase in the level of adoption of pre-letting and pre-sale financing arrangements by the property development companies in Global South countries. The improvement in the rate of adoption is neither intrinsic nor connected to any of the qualities or profiles of the property development companies. It shows that what motivates the adoption of pre-letting and pre-sale financing arrangements is extrinsic. As this study focused primarily on the level of adoption of pre-letting and pre-sale financing arrangements, further research could examine the factors motivating their adoption beyond the profile of property development companies. The information provided in this study illustrates the current trends in the adoption of these financing arrangements by development companies and shows how adoption levels responded to global and national financial crises and the COVID-19 pandemic. Further studies can be conducted to extensively examine the combination of both internal and external factors that contribute to the adoption of pre-letting and pre-sale financing arrangements by PDCs in emerging markets.

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From Timber to Steel: Socio-demographic Drivers Underlying Homeowners' Change in Roof Truss Preferences in Ghana

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Abstract

Homeownership is an important factor in wealth-making and socio-economic mobility. However, decisions about construction materials, especially roof truss systems, are less studied in developing economies. The shift from timber to metal trusses in Ghana echoes wider economic, socio-demographic, and sustainability concerns. We investigated the socio-demographic factors that influence homeowners' choices for truss materials to provide information for sustainable housing policy and market development. Survey data were obtained from 300 homeowners purposively selected across two major urban cities. Logistic regression shows that marital status, gender, income, education, and third-party advice had significant effects on material preference. Women, unmarried individuals, and lower-income and less educated homeowners are more likely to select wood for truss construction. On the other hand, homeowners who received third-party advice and have higher levels of education and earnings above US$200 had greater odds of selecting metal trusses. Our findings indicate that socio-demographic micro-level considerations play a notable role in shaping timber-to-metal transitions by private residential builders.

Keywords: *homeownership, housing policy in Ghana, roof truss material preference, socio-demographic factors, sustainable construction*.

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1. Introduction

A building's roof is one of the largest, most important, and priciest components of any housing unit (Ejiga, 2010; Dashore, 2019). Its design, which often incorporates either trusses or rafters, is critical for carrying roof loads safely while safeguarding aesthetic appeal and durability. Trusses have replaced rafters in contemporary residential construction due to their ease of installation, superior strength and efficient load transfer to exterior walls, which relieves the interior walls of stress (Elliot, 2015). Furthermore, trusses support a large amount of load across wide spans compared to their weight. This makes them the preferred choice in modern roof construction (Tüfekci et al., 2020).

Several materials are available for roof truss construction. Each of these materials has unique properties and great implications for building performance (Jahan and Edwards, 2016; Akadiri, 2018; Selva, 2019). Since the type of material used for truss construction affects both the structural integrity and environmental sustainability of the building, its selection is a critical decision. Supporters of green construction stress the need for renewable and low-carbon materials, including wood, to reduce CO_2 emissions while promoting sustainable urban development (Seyfang, 2009; Bevan and Woolley, 2008; Høibø et al., 2015).

Conventionally, wood has been the dominant material for truss construction owing to its strength, light weight, and ease of installation (Tigue and Hoigard, 2011; Boadu and Antwi-Boasiako, 2016). However, current trends present a growing demand for metal trusses, particularly in urban and peri-urban cities in many countries in Sub-Saharan Africa (Parker, 2018; Appiah-Kubi and Tepketey, 2011). Metal trusses are said to provide a longer lifespan and higher durability compared to timber. Nevertheless, they are often more expensive and usually need additional insulation to reduce heat transfer (Narang, 2005). The shift from wood to metal as a material of choice in roof truss designs has raised greater concerns about material selection in the construction industry. It also brings into question compatibility with the United Nations' Sustainable Development Goal 11 as a drive towards safe, green, and inclusive housing. This shift signifies more than a change in structural preferences. It marks a broader reconfiguration of material culture in housing construction.

While several studies have examined the technical attributes of roofing truss materials, there remains a significant gap in understanding how socio-demographic characteristics shape these choices. Previous works have indicated that material preferences often involve complex trade-offs shaped by cost, cultural values, experiential knowledge, and environmental awareness (Engel et al., 1993; Chueh and Kao, 2004; Wastiels and Wouters, 2008; Ogunkah and Yang, 2012; Høibø et al., 2015; Antwi-Boasiako and Boadu, 2016). Wastiels and Wouters (2008) and Ogunkah and Yang (2012) found that material selection often involves a mix of objective and subjective criteria, ranging from affordability to perceived prestige and environmental values. Høibø et al. (2015) also noted that persons with strong ecological beliefs often prefer wood due to its perceived sustainability. These studies have largely emerged from European or North American contexts, where housing markets and resource availability differ considerably. The African context, particularly in fast urbanising cities such as Kumasi and Accra, is not well-researched. There, consumption decisions are progressively being shaped by a mixture of forces of modernisation, affordability considerations, and changing social desires.

In order to address this existing gap, the current study investigates the socio-demographic factors that drive homeowners' decisions to choose either wood or metal for roof trusses. By focusing on this material shift, our study aims to contribute to a better understanding of sustainable housing transitions in the African urban settings, while also informing construction practice and policy. The study also contributes to theoretical debates by applying the Sustainability Transitions Theory and the Material Choice Theory to explore the social-demographic drivers of roof material preferences in home construction.

2. Theoretical Framework

We relied on two interrelated theories to guide the current research: Sustainability Transitions Theory (STT) and Material Choice Theory (MCT). These theories together offer a robust framework for examining how the socio-demographic drivers influence homeowners' decisions in selecting truss materials and how these decisions relate to broader sustainability transitions within the built environment.

2.1 Sustainability Transitions Theory

The Sustainability Transitions Theory (STT), as developed by Geels (2002) and later expanded by Markard et al. (2012), explains society's transition from traditional to contemporary materials within the broad scope of environmental and economic sustainability. The theory provides a framework to understand previous transitions and to hypothesise how future transitions could occur (Scoones et al., 2020; Jacobsson and Bergek, 2011). In the context of housing, the shifts in material use, such as the movement from wood to metal trusses for roofs, are not isolated technical decisions but parts of broader changes in norms, markets, technologies, and environmental regulations. According to STT, transitions occur through action at three interacting levels: niche innovations, socio-technical regimes, and landscape (Geels, 2011). Historically, in Ghana, timber has dominated roofing systems. However, the growing concerns over forest depletion, changing urban aesthetics, rising maintenance costs, and rising availability of metal fabrication services are destabilising this regime. Thus, metal trusses have emerged as a niche innovation, gradually displacing wood due to their perceived modern appeal and durability. Social pressures from urban expansion, and changes in policy, which promote sustainable housing and increased access to imported materials, all act as landscape pressures facilitating this shift. The theory also highlights the influence of a mix of market forces and user preferences on the transitions, which aligns with the current study's examination of socio-demographic factors such as income, education, and social influence.

Research in related fields, such as urban development (Raworth, 2012), energy transitions (Kemp et al., 1998), and sustainable agriculture (Smith et al., 2005), highlights how market forces, policy levers, and socio-cultural shifts act synergistically to reshape material adoption based on the STT. Although STT has been used in previous studies, such as those mentioned, its application to housing material transitions in African cities remains very limited, particularly in relation to private homebuilders who dominate the housing supply in Ghana. In filling this gap, we applied the STT in the current housing study to provide a valuable lens through which we could interpret the interplay of the socio-demographic factors as they shape homeowners' decisions.

The timing of this study is critical because Ghana and most other African cities are presently undergoing rapid urbanisation, policy pressure towards SDG-conformant housing, and material supply realignments due to deforestation, tariffs on imports, and rising construction costs. It is therefore urgent to understand which factors are driving the switch from timber to steel, and why, in order to inform sustainable housing policy and climate-conformant building practices before current transitions become locked in.

2.2 Material Choice Theory

The Material Choice Theory (MCT) shows how individuals assess and choose materials based on both subjective and rational evaluations (Ashby, 2005). According to Ashby (2005), individuals often assess materials based on their cost, durability, aesthetics, environmental impact and ease of use. This theory has been extended to account for psychological and social influences. Kahneman and Tversky (1979), Wastiels and Wouters (2008), and Bui et al. (2025) noted that traditions, perceptions, and third-party recommendations significantly shape choices, especially in cases where users lack technical knowledge. This finding is particularly true in developing countries where access to material information is limited, and construction decisions often rely on artisans, family, or housing developers. In the context of this study, homeowners are not passive recipients of material trends. Rather, they navigate constraints and preferences to select materials that align with their socio-economic positioning. MCT also explains that material choice decisions are not always rational and instead are subject to loss aversion and perceived risk (Rao and Davim, 2008). In roofing decisions, for instance, the majority of homeowners perceive timber as familiar but risky (i.e., subject to termite infestation or fire), while metal is unfamiliar but potentially long-lasting. Framing material choices, particularly under the conditions of uncertainty and budget restraint, helps explain why certain socio-demographic groups choose certain materials.

MCT was applied to study low-carbon materials (Jahan and Edwards, 2016), wood housing (Høibø et al., 2015), and cities' building practices (Wastiels and Wouters, 2008). Despite the widespread use of MCT in previous studies, there is a notable gap in its application to the housing and construction sectors within Sub-Saharan Africa. This study fills the gap by linking socio-demographic variables to material choice within the transition from timber to metal trusses using the MCT. In doing so, we extend the theory into a new empirical and regional domain, African real estate and housing construction, where they have scarcely been operationalised.

3. Materials and Methods

3.1 Study Area

The study was conducted in Ghana's two major urban cities, Kumasi and Accra. These cities represent distinct socio-economic, ecological, and cultural profiles and have been undergoing rapid urbanisation (McCaskie, 2007), making them ideal for studying construction material preferences. The 2010 National Population and Housing Census puts the population of Accra at 1,848,614 (887,673 males; 960,941 females) and Kumasi at 2,035,064 (972,258 males; 1,062,806 females), with high literacy rates ranging between 89.1% and 91.3% (Ghana Statistical Service, 2012). Thirty-six percent and thirty-eight percent of the population of Accra and Kumasi, respectively, are married, while 46.1% and 44.4% respectively, are single/have never married. According to the

Ghana Living Standards Survey, the Ashanti region has an average annual per capita income of approximately GH₵8,000 (US$ 2,492.2) while Accra's average annual per capita income is about GH₵5,500 (US$ 1,713) (Ghana Statistical Service, 2014).

Urbanisation in both cities has increased the demand for self-built housing, with homeownership often considered a symbol of economic security. Historical statistics confirm that in 2010, approximately 42.7% of the housing stock comprised owner occupation (GC & B Bank Report, 2022), indicating that property ownership is a predominant tenure form. It raises all the more the importance of material choice decisions by property-owning individuals. For Accra and Kumasi, the building culture involves self-build and has an incrementality influence such that households (and not large building contractors) build in that way. For example, studies on housing supply from Ghana's cities confirm that self-builders are robust housing delivery actors by borrowing personal resources, savings, and informal materials and workspaces (Tipple and Korboe, 1998; LSE Cities and African Centre for Cities, 2021). This indicates that property-owning individuals, and not building contractors, often experience freedom in terms of material choice decisions to the extent that socio-demographic drivers become prominent. For Kumasi, the prevailing housing form is compound housing, where several households co-reside in one building and are often constructed from indigenous building materials and by indigenous building workers. Such types of buildings rely on freely available locally conceived materials and resultant building costs, wherein homeowners take personal decisions about truss materials. In Accra, houses utilise sandcrete block walls and aluminium or asbestos roofing as common building materials. These practices emanate from a building culture where traditional and contemporary materials both feature in roofing and building support, making the decision between timber and steel significant.

Accra and Kumasi reflect contrasting ecological zones: the Coastal Savannah in Accra and the Deciduous Forest in Kumasi, providing useful variation in climate and housing materials. Accra has two rainfall maxima with a prolonged dry season. The mean annual rainfall is between 740 and 890 mm (Agyirifo and Otwe, 2011). Kumasi is characterised by a tropical wet and dry climate, with relatively constant temperature throughout the year. It receives an average rainfall of about 1400mm per year. The socio-economic diversity and urban character of these towns made them ideal settings for examining material choices in roof truss construction.

3.2 Research design, sampling technique, and data collection method

The study employed a convergent mixed-methods research design, combining quantitative and qualitative techniques to enhance the robustness of findings. While the quantitative data helped uncover general patterns and statistically significant relationships, qualitative insights provided contextual depth on decision-making processes.

3.2.1 Sampling strategy

Due to the unavailability of a comprehensive database on truss material usage, a purposive sampling technique was used to identify 150 homeowners in each city who had constructed houses within the last 5–10 years. Initial respondents were identified through

snowball sampling and screened to ensure they had personally engaged in decisions regarding roof truss material.

3.2.2 Data collection

Respondents' socio-demographic data (i.e., sex, age, employment status, educational attainment, marital status, and monthly income) were collected with a semi-structured questionnaire. The questionnaire also asked respondents to confirm the material selected for truss construction (wood or metal), the cost of installation, whether advice was received (yes/no), and the source of that advice (e.g., family members, craftsmen, or architects). The questionnaire was tested for reliability and validity using the content validity approach before it was administered. Content validity was ensured by consulting subject-matter experts in housing studies and sustainability research.

In-depth interviews were conducted with a subset of 40 homeowners (20 from each city) to explore homeowners' reasoning for material choice. The homeowners selected for the interviews were drawn from the survey respondents using purposive sampling. Selection was based on their willingness to participate further, diversity in socio-demographic backgrounds, and contrasting choices of roof truss materials (timber and metal). This ensured a balanced representation of perspectives for deeper exploration of homeowners' reasoning behind material selection.

The administration of the questionnaires and the interview sessions was held in English. Verbal consent was obtained from all participants, and interviews were recorded and transcribed with permission.

3.3 Data analysis and presentation

3.3.1 Quantitative analysis

Descriptive statistics (frequencies and percentages) were used to summarise socio-demographic characteristics. The frequency and corresponding percentage of each data were presented in Table 1. To examine the influence of these characteristics on truss material choice, we conducted a binary logistic regression analysis using the Statistical Package for Social Sciences (SPSS) version 20. The dependent variable was coded as a binary outcome: Wood = 0; Metal = 1. The independent variables included gender, marital status, age group, education level, income range, and receipt of third-party advice.

The model performance was assessed using Wald's χ^2 test for statistical significance of the coefficients, Cox & Snell R^2, and Nagelkerke R^2 tests for explanatory power, and classification table accuracy to assess the model's predictive accuracy. The predictive accuracy of the model was subsequently evaluated by comparing the predicted homeowners' material choice (i.e., wood or metal truss) against the observed homeowners' choice (Pampel, 2000).

3.3.2 Qualitative data analysis

The qualitative responses were analysed thematically, using inductive content analysis, to extract recurring reasons and context-specific motivations for material choice. The steps in this analysis included open coding, category generation, and theme identification.

The codes were developed independently by two researchers and later reconciled to ensure intercoder reliability. The emerging themes centred on material performance, insulation, affordability, professional recommendations, and perceptions of longevity.

4. Results and Discussion

This section presents the evidence on the socio-demographic factors that drive homeowners' decisions between wood and metal trusses in Ghana. It also weaves together outcomes from both qualitative and quantitative analyses to determine how the socio-demographic variables and expert advice impact decisions and frame these in broader theoretical concepts of sustainability transitions and material choice theory. The data revealed several structural decision points within the roofing process, including: timber versus metal trusses and whether or not to consider third-party recommendations. These decisions are not made in a vacuum, but are filtered through the lens of household characteristics.

4.1 Socio-demographic profile of homeowners

The socio-demographic profile of homeowners in the current study is presented in Table 1. Out of the 300 homeowners, 71.7% were male, and 28.3% were female. The underrepresentation of females was a notable limitation that mirrors actual ownership patterns in Ghana's urban centres and was reflected in respondent selection through snowball sampling. This gender disparity was revisited later in the policy section to propose interventions that ensure greater equity in housing decision-making. Gender inequality in property ownership continues as a significant challenge across sub-Saharan Africa. Societal structures in Ghana conventionally make men the heads of households and property owners (Oduro et al., 2011). This highlights gendered control over housing properties, which has wider implications for economic security, wealth distribution, and policy strategies that target the promotion of gender fairness in property rights. Our finding is consistent with Adzorgenu-Amponsah (2019), who found that male homeownership in Ghana constituted about 86.7%. According to Gaddis et al. (2018), women are about 20 million less in property ownership when compared to men across the region. The authors attributed this inequality to biased societal norms and inheritance laws.

The respondents were predominantly within the 31–50 age range (72.6%). As Coulson (1999) noted, homeownership connects with life cycle stages, and there is a higher tendency for homeownership among individuals above 40 in Ghana (Ghana Statistical Service, 2013). This is because people within this age class often prioritise retirement planning. A related study by Asiedu (1999) in Kumasi found that 80.2% of homeowners were between 40 and 60 years old. A large portion of homeowners (55.3%) had undergraduate qualifications, which reflects similar patterns in the study by Adzorgenu-Amponsah (2019). Education relates to increased potential for income and informed decision-making in housing investments.

Almost all the homeowners (99.3%) were employed. An analysis of the income distribution shows that 17.7% of the respondents earned between US$20–200, while the majority earned above this range. The income profile observed in this study agrees with Adediran et al. (2020), who found that housing affordability is significantly influenced by income level in developing economies. The Material

Choice Theory suggests that affordability is a significant factor that influences material selection. Employment status is a key determinant of access to housing; the availability of economic resources allows property acquisition.

The homeowners in Accra showed a stronger preference for metal trusses (63%) compared to Kumasi (52%). This difference may be attributed to higher income levels in Accra than in Kumasi.

Table 1: Socio-demographic profile of homeowners involved in the study

Socio-demographic variable	Frequency			Percentage (%)
	Kumasi	Accra	Total	
Gender				
Male	105	110	215	71.7
Female	45	40	85	28.3
Age				
20 - 30 years	2	0	2	0.7
31 - 40 years	40	45	85	28.3
41 - 50 years	67	66	133	44.3
51 - 60 years	35	33	68	22.7
>60 years	6	6	12	4.0
Educational level				
Basic school	11	10	21	7
Senior High School	45	45	90	30
Undergraduate	84	82	166	55.3
Postgraduate	12	11	23	7.7
Marital status				
Single	30	33	63	21
Married	111	111	222	74
Widowed	8	7	15	5
Employment status				
Unemployed	2	0	2	0.7
Employed	149	149	298	99.3
Monthly income (US$)				
20 – 200	25	28	53	17.7
>200	123	124	247	82.3
Preference for roof truss material				
Wood	72	45	150	50
Steel/Metal	78	95	150	50

4.2 Socio-demographic determinants of material selection

This section presents the results of a binary logistic regression analysis, complemented by qualitative insights from homeowner interviews, to examine the extent to which socio-demographic factors influence homeowners' choice of roof truss material: wood or metal. The quantitative data used in the regression model included age, sex, educational level, marital status, monthly income, employment status, and whether or not the respondent received third-party advice. The dependent variable was the material choice (coded as 0 = timber, 1 = metal). The objective of this analysis is to statistically test for significance which of these factors play an important role in the decision to choose roof truss material and provide a basis for linking socio-economic characteristics with observed changes in material choices.

In addition to the statistical analysis, insights from in-depth interviews with selected homeowners were incorporated to provide context and explain the rationale behind these material choices. The objective of this mixed-methods approach is to both statistically identify significant demographic predictors and capture the narratives and subjective factors driving homeowners' material preferences. The combination of these approaches enables a richer understanding of how factors such as income, marital status, education, and gender interact with personal values, perceived durability, affordability, and access to expert advice. The findings aim to inform policymakers and industry stakeholders about which household segments are more likely to adopt sustainable and long-lasting roofing solutions and why.

Table 2 presents the logistic regression results. The model showed a predictive accuracy of 79.7%, with significant effects observed for marital status, education, gender, income level, and third-party suggestions ($p<0.05$). Other variables, such as age and employment status, were not statistically significant in the model. The Cox & Snell R^2 and Nagelkerke R^2 values of 0.406 and 0.542, respectively, show a substantial explanatory power of the model.

Regarding the variables with statistically significant effects on the choice of roof truss materials, the analysis proved that females were 2.1 times more likely to opt for wood over metal. This preference was supported by qualitative insights, as one female respondent in Kumasi noted: "I chose timber because it's what I am used to. The carpenter said it would work just fine, and I trusted him." Another female homeowner in Accra stated that: "I didn't want to go for metal because once they mentioned the cost, I stopped thinking about it. Wood is what I grew up seeing, and I trust it. For me, as long as it covers the house, I'm okay with timber." These quotes underscore the influence of familiarity, which aligns with the observed gendered pattern of material selection.

Unmarried individuals (i.e., single homeowners) were 56% less likely to select metal trusses compared to married individuals. A male respondent who was single stated: "I don't see the need to spend too much on metal if I am building just for myself. Maybe if I had a family, I would think differently." This reflection suggests how life stage and future planning can influence material choices. Homeowners earning between US$20–200 had 42.6 times greater odds of selecting wood trusses compared to respondents who earn above US$200. One homeowner made the following remarks:

"Trusses made from steel are more expensive than wood; however, they last longer in service. I decided to spend a little bit more because I could afford it." [Homeowner 12, Accra, November 2023].

Educational achievement also influenced preferences; senior high school graduates were 4.7 times more likely to choose wood over metal compared to undergraduates. One participant from Kumasi, who was a senior high school graduate, stated: "I went with timber because it was the cheapest, and I could not afford metal. It's a temporary house anyway… for me, metal is just safer and more lasting, but I had to wait until I could afford it. It is too expensive up front." [Homeowner 5, Kumasi, December 2023]. These responses reflect how affordability and perceived building permanence intersect with educational background and income to shape roof truss material choices.

The regression results further showed that those who received third-party advice leaned towards metal trusses. One respondent cited professional assistance: "A woodworker recommended metal trusses for my large, open-span rooms to avert sagging, which often occurs with wood." [Homeowner 100, Accra, November 2023].

Similarly, another respondent from Kumasi commented: "My brother is a building construction expert, and he advised me to use metal because it handles rain and termites better. I would not have known this on my own." These transcripts show how technical advice from informed sources can shift homeowners' preferences towards one material.

Our findings align with the Material Choice Theory, which suggests that cost and social influence are central to material selection (Ashby, 2005). Higher-income homeowners possess greater purchasing power to invest in long-lasting materials like metal, while married respondents may be more likely to prioritise family security and long-term value, thereby preferring durable roofing systems. The impact of third-party advice on material choice also suggests that access to expert knowledge may reduce reliance on traditional norms or cost-based decision-making. The integration of the qualitative responses underscores how socio-demographic variables translate into practical material selection decision pathways, blending economic realities, social influence, and personal values. Our study further responds to a significant gap by employing Sustainability Transitions Theory to examine how socio-demographic factors shape material transitions, particularly in self-constructed or informal urban housing, a common mode of domestic building in Ghana and across most of Africa. In contrast to the concentration of attention across STT-based studies toward technological or policy-initiated alterations, our findings indicate that socio-demographic micro-level considerations play a notable role in shaping timber-to-metal transitions by private residential builders.

Table 2: Logistic regression results of the socio-demographic factors that influence homeowners' choice of materials for roof truss construction

Predictor factor / Socio-demographic factor	B	SE	Wald	df	p-value	Exp(B)
Gender (Male – 0; Female – 1)	.730	0.369	3.923	1	.048	2.076
Educational level (Undergraduate)			23.939	3	.000	
Educational level (Basic education)	22.534	13152.403	.000	1	.999	61.96
Educational level (Senior High School)	1.564	.359	18.989	1	.000	4.777
Educational level (Postgraduate level)	-.572	.684	.699	1	.403	.564
Age (41 – 50 years)			4.548	4	.337	
Age (20 – 30 years)	19.964	26257.217	.000	1	.999	29.917
Age (31 – 40 years)	-.648	.382	2.875	1	.090	.523
Age (>60 years)	-.827	17462.340	.000	1	1.000	.437
Age (51 – 60 years)	.286	.412	.481	1	.488	1.331
Marital status (Married)			4.380	2	.112	
Marital status (Single)	-.829	.396	4.380	1	.036	.436
Marital status (Widow)	20.360	9217.683	.000	1	.998	56.928
Employment status (Employed – 0; Unemployed – 1)	19.832	25159.746	.000	1	.999	63.995
Monthly income (US$) (>200– 0; 20 – 200 – 1)	3.751	.593	40.023	1	.000	42.577
Third-party advice on material selection (No – 0; Yes – 1)	-.922	.342	7.271	1	.007	.398
Constant	-.947	.356	7.071	1	.008	.388

Note: χ^2 p value = 0.158

5. Conclusion and Policy Implications

This study examined the socio-demographic factors influencing homeowners' selection of roofing truss materials in two major Ghanaian cities, Kumasi and Accra. We found that marital status, education, gender, income level, and third-party suggestions significantly shape homeowners' decisions, while other factors, such as age and employment status, showed no statistical significance. These findings provide a nuanced understanding of the intersection between personal demographics and material choice in urban housing construction in Ghana. Our study's findings contribute to the scholarly discourse on material preference in sub-Saharan Africa by highlighting the influence of non-technical factors, such as socio-demographic characteristics and social advice, on structural construction decisions. This study brings forward the micro-level determinants that drive grassroots changes in material use, unlike existing literature, which focuses on technical structural attributes or policy environments. The implications of this research are particularly relevant given Ghana's ongoing urbanisation and increasing housing demand. In the face of the rapid expansion of the building construction industry, understanding the demographic dynamics behind roof truss material preferences offers a valuable entry point for both policy and practice towards achieving sustainability targets. Future research could broaden this study by investigating similar socio-demographic influences on material choices in other sub-Saharan African cities to validate and enrich these findings.

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Data availability

The authors confirm that the data supporting the findings of this study are available within the article.

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Residential Real Estate Market Characteristics and Mortgage Origination in Emerging Economies: The Case of Ghana

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Abstract

This study analyses the relationship between mortgage origination and residential real estate property characteristics in Ghana. Using transaction-based data on 1476 mortgages from 2008 to 2016, we apply the hedonic pricing model and multivariate regression to establish the role of structural property characteristics and residential real estate sub-markets in determining mortgage origination, separated into loan amount and loan-to-value (LTV) ratio. Further, the risk of default in the mortgages is estimated as an additional risk assessment tool for lenders. The findings reveal that residential sub-markets are important variables to consider when mortgages are originated. In Ghana, properties in Upmarket, Emerging upmarket, and Middle-income sub-markets tend to attract lower loan values in comparison to properties in Gated communities, primarily due to their neighbourhood characteristics. In addition, properties in emerging, upmarket, and middle-income sub-markets attract higher LTV ratios. It was revealed that in upmarket areas, the number of bedrooms, detached, and outhouses does not contribute to determining the risk of default in mortgages. We also find that the risk of default by mortgage borrowers is negligible, indicating that lenders can safely expand their customer base. The findings offer rare insights into the emerging mortgage market in Africa for both policy and investment purposes.

Keywords: *Mortgage Origination, Market fundamentals, Residential Sub-Markets, Ghana, Emerging Market*

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1. Introduction

Mortgage markets play an important role in shaping the development of residential real estate markets. It is more crucial for African countries, where residential real estate markets are vital for both population growth and employment in the construction industry. However, the residential real estate market in Ghana differs from those in developed economies in terms of size, mortgage financing, and availability of data. These can be attributed to the fledgling stage of this market. Mortgage transaction-based data in Africa, specifically across sub-Saharan African (SSA) countries, is generally scant, and housing financing is usually informal (Donkor-Hyiaman & Owusu-Manu, 2016). The mortgage market also struggles with attracting investors due to weak credit markets (Billmeier & Massa, 2009; UN-Habitat, 2008).

Nonetheless, mortgage markets are gradually developing in SSA (Sub-Saharan Africa) countries. The real estate market is generally facilitated by the availability and affordability of loans to middle-class workers in the economy (Agnello et al., 2020; Ambrose & Diop, 2014; Hochstenbach & Aalbers, 2023). However, among other factors, the creditworthiness of borrowers determines the willingness of banks and financial institutions to lend for housing. In the absence of reliable credit data and indirect support from the government[1], in Ghana, for instance, lenders are left with the income of borrowers and property characteristics to originate mortgages. While access to long-span transaction data is a challenge in Ghana's mortgage market, it does not justify the scarcity of studies on mortgage origination, given the rapid growth in the sector. Studies that have broached the subject of mortgage origination in Ghana have relied on survey data and macroeconomic variables (see Boamah, 2011; Gavu & Adamu, 2015; Teye et al., 2015; Ampofo, 2020) without recourse to mortgage transaction data (see also Asres et al., 2020). These studies do not present a more accurate picture of the situation regarding mortgage origination, as we have done in this study for the first time in the Ghanaian residential real estate literature.

The empirical literature on mortgage origination encompasses defaults (Mian & Sufi, 2009; Guiso et al., 2013; Campbell & Cocco, 2015), the cost of mortgages (Titman et al., 2005), and property characteristics (Asres et al., 2020). Campbell and Cocco (2015), in particular, indicate that high loan-to-value (LTV) and loan-to-income ratios can increase the probability of negative home equity and thereby trigger defaults (see also Borgersen, 2020). Guiso et al. (2013) also find, through survey data, that proximity to strategic defaulters and non-financial factors, such as fairness and morality, affect default behaviour. In terms of costs, Titman et al. (2005) discovered a weak relationship between the LTV ratio and spreads in the US, which may be attributed to the endogeneity of the LTV choice. They further reveal that the average LTV ratio per lender has a strong positive relationship with credit spreads, confirming the notion that high LTV mortgages require substantially higher spreads.

Property characteristics also tend to influence mortgage spreads and origination, since they affect default risks. For instance, Von Furstenburg and Green (1974) document the importance of location in terms of mortgage default risk and show that property loans made in suburban locations were less risky than those made in central city locations. Again, Mian and Sufi (2009) reveal a sharp increase in mortgage defaults in 2007 in the United States, which was significantly amplified by subprime ZIP codes. However, the LTV ratio is claimed to be the

[1] Such as improvement in economic and regulatory environment for the housing sector, creation of land banks, and subsidising infrastructural costs to developing sites (Bank of Ghana, 2007).

single most important determinant of mortgage defaults, whilst other factors, such as property characteristics, may or may not have an impact on defaults (Qi & Yang, 2009).

For the mortgage market in Ghana, Soyeh et al. (2021) reveal the importance of property types in determining their values, with Gated communities attracting premium prices or rents compared to non-gated communities in Accra. This study is a clear revelation of price differentials in property values in major cities in Ghana. This is also evident in other major cities around the world, as shown in the disparities of urban forms and functional zones in 10 megacities in China (Huang et al., 2024). The literature on mortgage origination in Ghana mostly covers the influence of macroeconomic variables (Boamah, 2011), the potential for a secondary market for financing (Boamah, 2009), affordability and volume (Gavu & Adamu, 2015), supply and demand factors (Teye et al., 2015), and repayment mortgages (Ampofo, 2020), often utilising survey data. Furthermore, the results in these studies are subject to unstable macroeconomic conditions and respondent sentiments (see Smith & Yezer, 2023). This setting is unlike advanced markets, such as the United States, which has available data on mortgage transactions and reliable national survey data that includes borrower characteristics (Sirignano et al., 2018).

Due to contextual differences, the large body of literature, which focuses on advanced markets, may not apply to Ghana. Hence, the main objective of this study is to determine the relationship between mortgage origination (separated into loan amount and LTV ratios) and property characteristics (structural attributes and neighbourhood qualities - market segmentation) and estimate default probabilities. There is no evidence of this kind in the available literature, and hence, this presents an opportunity to expand the discourse on mortgage origination in sub-Saharan Africa, with Ghana as a case.

We employ the hedonic pricing model (HPM) (Rosen, 1974) to analyse how residential property characteristics determine loan amount and LTV ratio. The value of a property is essentially the sum of the price of the structure and the land on which it is built. These are the two most important determinants that should be included in the model (Eurostat (European Commission), 2013). House prices are determined by structural features (i.e., floor size, bedrooms, outhouse, etc.) and location (sub-markets) (Fernández-Durán *et al*., 2011). By extension, we estimate default probabilities for mortgages through a logistic regression approach using the same attributes applied in the HPM.

Based on our findings, it is possible to understand how mortgage providers originate loans in such a highly constrained and illiquid mortgage market. The results would be relevant to the government in understanding how mortgage originators make decisions, as well as to financial institutions and non-governmental organisations in designing and recalibrating housing finance systems in Ghana. This study also contributes to affordable housing policies aligned with SDG 11, which aims to make cities and human settlements inclusive, safe, and sustainable. By addressing housing deficits and promoting homeownership, Ghana can simultaneously develop its mortgage and housing sectors (National Development Planning Commission (NDPC), 2017).

2. Literature review

In this review, we capture the evolution of the Ghanaian mortgage market, the determinants of loan amounts, LTV ratios and mortgage defaults, as well as a theoretical framework to justify the relationships examined.

2.1 Ghanaian mortgage market evolution

In Ghana, the mortgage market has experienced slow development, constrained by high lending rates, low incomes, and inconsistent collateral systems. The Ghana mortgage market remains nascent, ranking 10th in Africa, with outstanding transactions estimated at US$747 million and a mortgage-to-GDP ratio of 0.14% (Centre for Affordable Housing Finance Africa [CAHF], 2019), while South Africa ranks 1st on the continent, with outstanding mortgage markets valued at around US$67 billion and a mortgage-to-GDP of 19.56% (CAHF, 2019). The informal private sector, accounting for 80% of the housing supply in Ghana, primarily targets low-income groups (Ehwi et al., 2020; Andreasen et al., 2021). Formal mortgages primarily serve middle- and upper-class brackets (Asante et al., 2022). Recent financial reforms, such as the Ministry of Works and Housing securing US$17.2 million from government and private sector sources in 2018 and a US$237.7 million funding injection in 2019 (Ministry of Finance, 2019), aimed to expand access to housing. These interventions were not only target-oriented but also strategic in accelerating mortgage market development.

The mortgage markets in Africa, with the exception of South Africa, are nascent. Boamah (2010) reveals the inadequacy in housing delivery in Ghana and accounts for poor and inadequate housing consumption. The result is underpinned by the fact that most people might have financed their home acquisitions from personal savings (Boafo et al., 2017). In Nigeria, low incomes, high interest rates, and inadequate lending institutions limit mortgage access (CAHF, 2016; Nwuba & Chukwuma-Nwuba, 2018), while Uganda faces low formal mortgage access (Kalema & Kayiira, 2008).

2.2 Determinants of mortgage (loan) amounts

The stalling in the development of the housing markets in Africa, especially Ghana, can be attributed to the small size of the mortgage market (see Agnello et al., 2020; Ambrose & Diop, 2014; and Hochstenbach & Aalbers, 2023). The few banks and financial institutions willing and able to lend to potential homeowners assess the amount and risk based on borrower incomes, mainly generated from salaries and property features (segmentation or sub-market). Only 8 of Ghana's 31 banks offer mortgages officially, typically requiring a 20% upfront payment and targeting new residential properties[2]. The risk premium factor is deemed the most important determinant in the affordability of mortgages in Ghana (Owusu-Manu et al., 2016).

Mortgages are contracted as long-term transactions for 30 years or more in developed economies. In Ghana, the period ranges from 10 to 20 years. Loans (mortgages) are typically denominated in foreign currencies (USD or GBP) with fixed rates or in local currency (GHS) with variable rates and are subject to Bank of Ghana guidelines. For instance, if the cheapest newly built house for sale is US$25000, a buyer needs to deposit 20% of this amount and earn US$970/month to afford a 20-year mortgage at 13.5% per annum (Sarfoh et al., 2017). Given the historical and prevailing economic conditions in Ghana, this cost is not affordable, despite the insistence by the country's largest mortgage provider, Republic Bank (Sarfoh et al., 2017). The Home Mortgage Finance Act, 2008 (Act 770) regulates home mortgage financing and related matters, including foreclosures. However, it remains challenging for banks and home finance companies to recover properties from defaulting customers. Thus, in line with the assertion by Teye et al. (2015), the government needs to ensure that better loan pricing and repayment mechanisms are in place to promote mortgage financing in Ghana.

[2] https://lakesideestate.com/mortgage-providers-ghana/#:~:text=your%20dream%20home.-,1.,leading%20mortgage%20provider%20in%20Ghana.

In racially homogeneous countries like Ghana, housing finance and mortgage origination are primarily based on individual borrower income levels and property characteristics. The lack of credit data, which is crucial for evaluating the creditworthiness of borrowers, significantly contributes to this. Past literature shows that residential characteristics, such as location, type of property, landscaping quality, gross internal areas and plot size, explain both property rentals and property transactions in Ghana (Anim-Odame & Stevenson, 2010).

In terms of mortgage origination, Boamah (2011) found that exchange rates had an influence, given that mortgages are dollar-denominated. Nonetheless, there has been a gradual increase in the volume of mortgages as Ghana's mortgage origination increased from GHS 58 million in 2008 to GHS 342 million in 2013 (Gavu & Adamu, 2015). Boamah (2009), however, argues that the secondary mortgage market is not the best way to solve the housing finance problem in Ghana because basic challenges (such as land title security, long-term funding, and macroeconomic stability) need to be resolved first.

2.3 Determinants of LTV ratios

Borgersen (2018) deduces that moral hazard, risk pricing, lending volumes, and collateral values, among others, influence the optimal LTV ratio for mortgagees. In the Netherlands, outstanding LTVs are driven by household characteristics, life-cycle effects, and mortgage type. The LTV follows a decline over time from mortgage commencement, but is higher by about 10% for non-repayment mortgages compared to repayment mortgages (Cunha et al., 2013). Specifically, Thebault (2017) examines property location (prime and vulnerable locations) and property price changes from the European Data Warehouse and finds overwhelming evidence of their effect on LTV ratios. This evidence supports the direct relationship expected between the LTV ratio and property characteristics in Ghana. In a study on LTV in mortgage lending for over 4000 banks across 46 countries, Morgan et al. (2019) find that mortgage loans have been successfully managed in countries with an LTV policy and suggest the inclusion of other macroprudential tools to complement the effects of LTV (Borgersen, 2018).

2.4 Determinants of mortgage repayment and default

On repayments, Ampofo (2020) indicates through a survey of mortgage lenders in Ghana that fixed-rate repayment plans are the most common, with higher-income borrowers and smaller household sizes demonstrating better repayment performance. Default mortgage risks are common among females, older, unmarried, and divorced individuals, and those who are financially illiterate (Owusu-Manu et al., 2019). In the Ashanti Region of Ghana (the next biggest city), demographic factors such as income level, property value (Belete & Yilma, 2020), and property location determine mortgage default rates (Awunyo-Vitor et al., 2015).

While loan-to-price (LTP) instead of LTV and borrower income are seen as key determinants of mortgage default in Spain (Galán & Lamas, 2019), US studies emphasise default costs over the LTV ratio (Harrison et al., 2004). Campbell and Dietrich (1983) indicate that payment/income and loan/value ratios, as well as unemployment rates, age and the original loan/value ratio can determine default propensity in a direct relationship.

Additionally, exchange rate fluctuations, high interest rates, and high house prices lead to higher initial monthly payments. Teye et al. (2015) also examined the interconnectedness of factors that determine the demand and supply of mortgages in Ghana. Among other challenges, the inability of financial institutions to establish the creditworthiness of potential borrowers

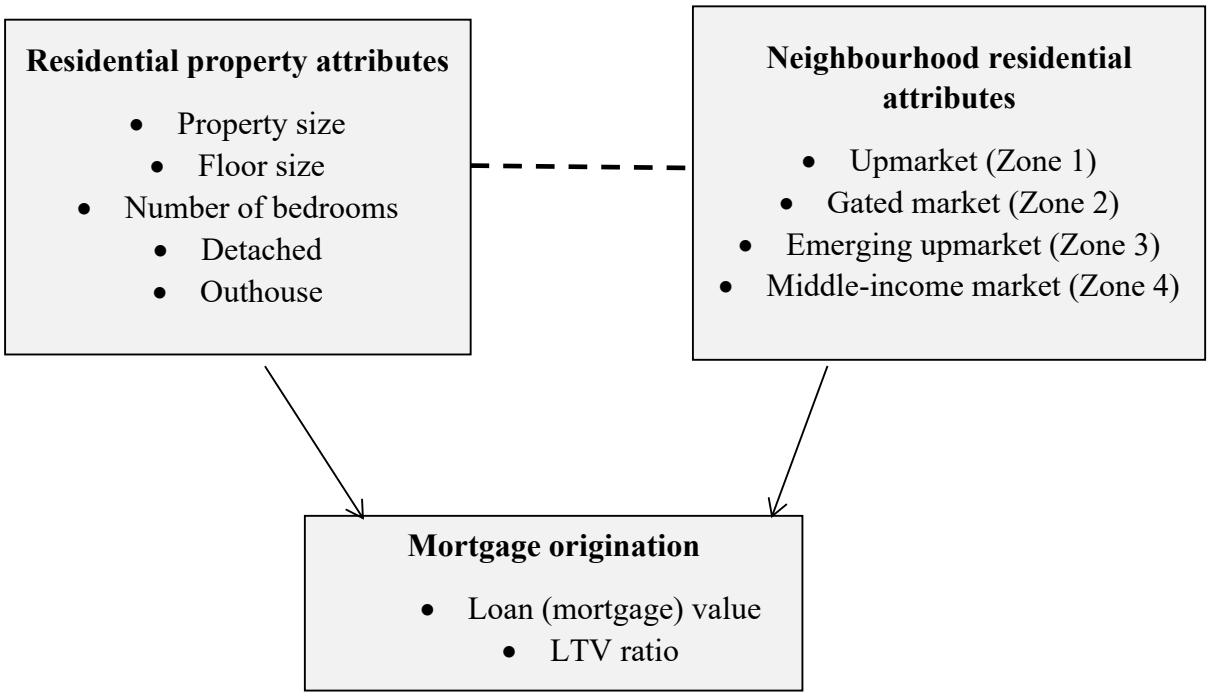
remains a significant obstacle to mortgage financing. The literature advocates for awareness creation on property rates and penalties to reduce the rate of default in Ghana (Awunyo-Vitor et al., 2015) and policies aimed at reducing mortgage rates (Owusu-Manu et al., 2016).

2.5 Research gap

Overall, existing literature has provided some evidence on the development of the mortgage markets and mortgage origination in Ghana. However, there exists no study on the relationship between mortgage values, LTV ratio and property characteristics using the housing market transaction data. The current paper differs from previous works because we seek to understand the determinants of mortgage values and high LTV ratios in Ghana. We also seek to estimate the probability of default on mortgages with the same residential property attributes for HPM. With the HPM, we examine how and to what degree property characteristics, market value, and neighbourhood qualities interact with financial burden to influence loan originations in Ghana's housing market. This approach provides a broader insight that is directly related to the market dynamics.

2.6 Theoretical framework

Figure 1 depicts the theoretical relationship between residential property attributes and mortgage origination as described in Sub-sections 2.2 and 2.3. The HPM is based on these connections. In this framework, property attributes and neighbourhood attributes are related to one another, especially given that we conceptualised the latter as sub-markets. It is inherent that property size, floor size, number of bedrooms and other property features correspond to the markets in which they are found (either Upmarket, Gated, Emerging, or Middle-income markets[3]). However, the relationship is not a straightforward "cause-and-effect" nexus. Hence, we have linked them with an undirected dashed line.



[3] Refer to the Appendix for the definition of Zones.

***Figure 1*: Residential property attributes and mortgage origination link**

Nonetheless, it is clear from the literature that the price or value of a property is a function of its structural features (i.e., property size, floor size, bedrooms, detached, and outhouse) and location (i.e., neighbourhood attributes). In this study, we have conceptualised neighbourhood attributes as sub-markets, including Upmarket (Zone 1), Gated market (Zone 2), Emerging upmarket (Zone 3), and Middle-income market (Zone 4). We also argue that both structural features and the location of properties have a "cause-and-effect" link with the value of the property. In terms of mortgage origination, the value of a property is proxied by the loan (mortgage) value. Lastly, to gauge the risk of this mortgage, the LTV ratio is used. We have used solid directed lines from property attributes and neighbourhood attributes to mortgage origination to indicate this "cause-and-effect" relationship.

3. Materials and Methods

In this paper, we employ the semi-log HPM to determine mortgage origination based on the linkages in Figure 1. We also use logistic regression to estimate the risk of default on mortgages.

3.1 Data

The data was obtained from the First National Bank (FNB) Ghana (formerly GHL Bank Ltd.). Data were provided for each of the 1,476 mortgage loans from 2008 to 2016[4], representing total mortgages originated in the Greater Accra region of Ghana. Greater Accra is chosen because it is the region with the most developed real estate market in Ghana. As of 2018, Ghana recorded 6,000 mortgages in a country of 6.6 million households (CAHF, 2018). Ghana currently has 8 mortgage providers, and FNB Ghana is the market leader and dominant player in mortgages in Ghana, with about 50 per cent market share.

3.2 Model specification

We employed two dependent variables (i.e., log of loan amount and LTV ratio) as in $logloan = f$ (I, L) and $LTV =$ (I, L), where I and L denote house characteristics (i.e. floor area, plot area, and bedrooms, etc.) and location (i.e., Zones[5] 1, 2, 3, and 4), respectively. The models to estimate are:

$$logloan_i = \mathrm{a_o} + \mathrm{a_1}\, \mathcal{X}_\mathrm{i} + \mathrm{e}_i \quad (1)$$

$$LTV_i = \mathrm{a_o} + \mathrm{a_1}\, \mathcal{X}_\mathrm{i} + \mathrm{e}_i, \quad (2)$$

Where $logloan_i$ is the log of the value of the loans originated, LTV denotes loan-to-value, $\mathcal{X}_\mathrm{i}$ is the vector of explanatory variables (outlined in Table 1), and e_i is the error term. The loan is logged to reduce the level variance to make it more appropriate for the linear model

[4] It is to be noted data is old because it was special and retrieved privately. This is not publicly available so it is difficult to obtain the current values. Private data on mortgage loans in African is difficult to obtain and hence the reasons why research in this topic is rare. Hence the importance of this research even with this available data which is rare.

[5] Refer to the Appendix for the definition of Zones.

specification[6]. Empirically, the log form of the HPM performs well, especially when certain property characteristics are unavailable.

The main aim of this paper is to understand how mortgage banks in Ghana make decisions when originating loans, and specifically how the sub-markets in which a property is located may influence the mortgage originator's decision. The results of models (1) and (2) are presented in Tables 5 and 6 using the multivariate linear regression approach with the Ordinary Least Squares (OLS) estimator to implement the HPM. For a cross-section of transaction data, the OLS seems appropriate at the level of analysis.

In furtherance of risk assessment for mortgage lenders, we develop an additional model to estimate the probability of default based on the LTV ratios, separating borrowers into two groups (i.e., Groups 1 and 2). Group 1 has an LTV ratio of 80% or higher, and Group 2 has an LTV ratio of less than 20%, in line with Epley and Liano (1999). Thus, we define the default (DF) as a dummy.

$$\mathrm{DF} = \begin{cases} 1, & if\ LTV \geq 80\% \\ 0, & if\ LTV < 20\% \end{cases} \qquad (3)$$

Therefore, we modify equation (2) as

$$DF_i = \mathrm{a_o} + \mathrm{a_1}\, \mathcal{X}_\mathrm{i} + \mathrm{e}_i \qquad (4)$$

with all variables retaining their descriptions. Given that equation (4) has a dummy as the dependent variable, we employ the logistic regression technique as opposed to the OLS regression. The logistic regression determines the probability between 0 and 1 (see Jackson & Kaserman, 1980), from which we can infer the chance of default by a mortgage borrower based on the house characteristics. We perform the appropriate diagnostic tests on all estimated regression models to confirm the reliability of the results.

Details of the variables are presented in Table 1. Location, in the context of this study, is defined as a dummy corresponding to four different zones. Location plays a significant role in securing mortgages. A detached house and outhouse are also included as dummies. According to past literature, such as Leow and Mues (2012), detached properties tend to have a higher forced sale value to valuation ratio at the time of default. A positive relationship is expected from outhouse, number of bedrooms, plot size and floor area.

Table 1: Variable specifications

Variable	Specifications	Expected sign
Log Loan Amount	Amount of mortgage in log form	-
LTV Ratio	Amount of mortgage divided by the property price	-
Upmarket (Zone 1)	1 = Property in Zone 1, 0 = others	Positive
Gated Market (Zone 2)	1 = Property in Zone 2, 0 = others	Positive
Emerging Upmarket (Zone 3)	1 = Property in Zone 3, 0 = others	Positive
Middle-Income Market (Zone 4)	1 = Property in Zone 4, 0 = others	Positive

[6] This is also a special case of the Box-Cox transformation (with $\lambda = 0$) popularly used to centre data (Asar et al., 2017).

Number of Bedrooms	Number of bedrooms per property	Positive
Log Plot Size	Plot size measured in square meters in log form	Positive
Log Floor Area	Floor area measured in square meters in log form	Positive
Detached	1 = Detached property, 0 = others	Positive
Outhouse	1 = Outhouse, 0 = others	Positive

The classification of residential real estate markets in Ghana into sub-markets, namely; Upmarket (Zone 1), Gated market (Zone 2), Emerging upmarket (Zone 3) and Middle-income market (Zone 4) is based on the Ministry of Local Government of Ghana nomenclature. The categorisation is along the lines of density, size of houses, and infrastructure of the area. The detailed description of the zones is presented for brevity reasons.

4. Results and discussion

4.1 Preliminary results

In Figure 2A, we present the average logged values of originated loans, purchase prices, and LTV[7] ratios from 2008 to 2016. Loan amount and purchase (property) price are directly related, as high property prices tend to attract high mortgages. The property price is the primary determinant of the loan amount (Fitzpatrick & McQuinn, 2007). We shed light on the corresponding average amounts in US dollars in Figure 2B. The average loan from 2008 to 2016 is US$61,208. There are variabilities in the average loans originated per year, with 2008 providing the lowest average value of US$49,235. This decline could be as a result of the global financial crisis, but 2009 recorded the highest average loan during the period investigated, at US$70,664, which could also be attributed to a recovery from the shock in 2008. Over the rest of the period, the loan amount hovered around US$67,424 in 2016 and US$55,511 in 2010.

As expected, the purchase prices of houses in Ghana vary, with the average house price during the period being US$112,836. The Lowest average house price purchased is US$71,290, recorded in 2010, whilst the highest average price registered is US$178,597 in 2013. From Figure 2 (A and B), the average LTV ratios were 96.20% from 2008 to 2016, with the lowest LTV ratio, originating from the bank, being 70.03% in 2014, while the highest LTV ratio was 120.13% in 2009.

[7] LTV ratios are not logged in this plot.

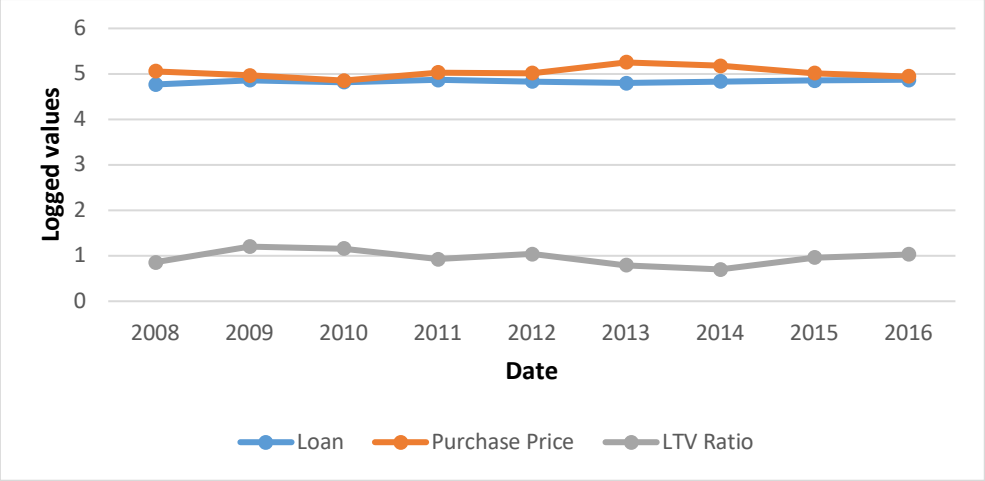


Figure 2A: Logged average residential mortgages in Ghana

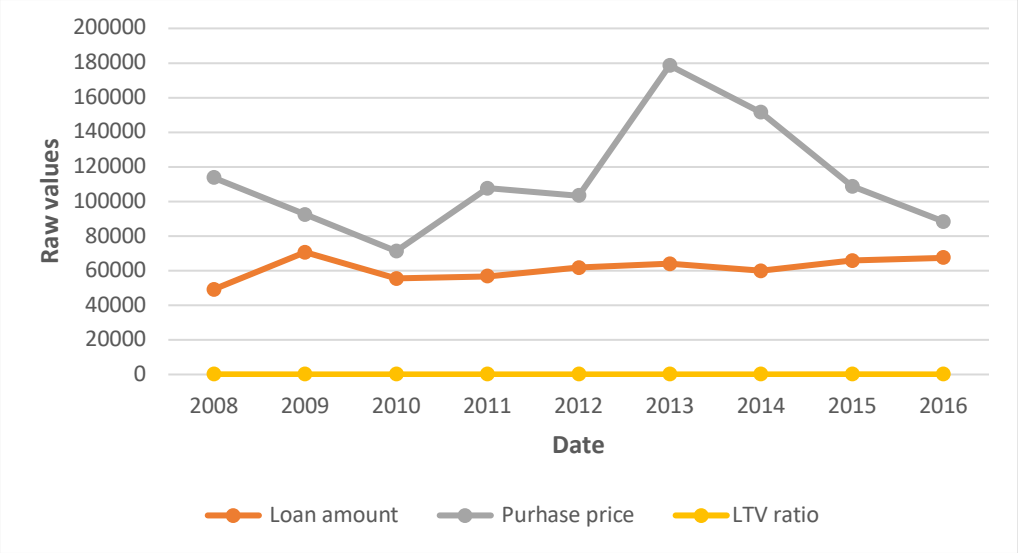


Figure 2B: US$ average residential mortgages in Ghana

Figure 3 illustrates loan values across residential sub-markets from 2008 to 2016, clearly highlighting the disparities. Properties in Upmarket areas (Zone 1) and Gated communities (Zone 2) tend to attract higher loan values from banks in comparison to Zone 3 (Emerging markets) and Zone 4 (Middle-income). As expected, this trend is observed across the period 2008 to 2016 for the top end of the market, with properties located in very expensive neighbourhoods.

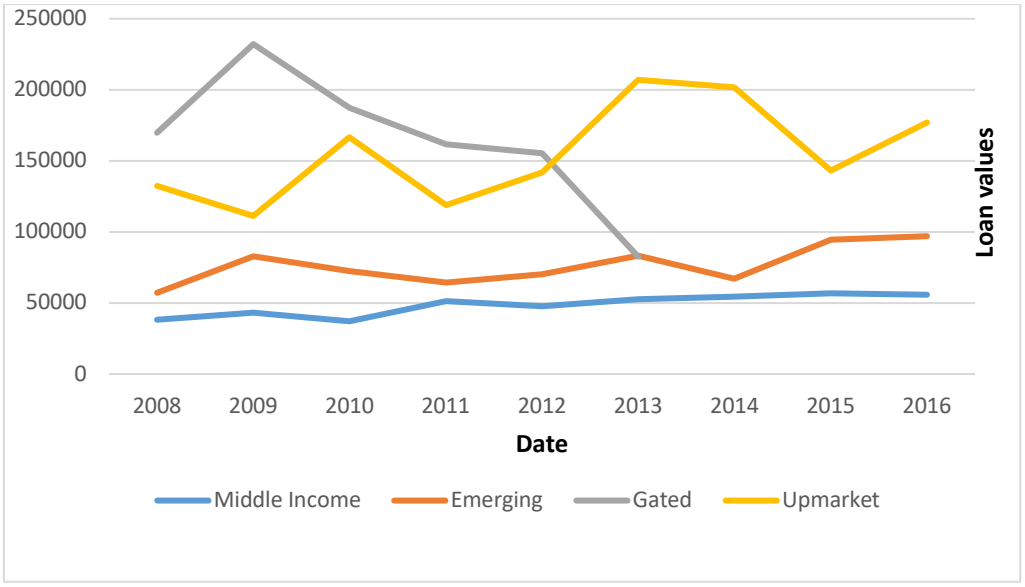


Figure 3: Loan values (US$) and residential sub-markets in Ghana

In Figure 4, we present the LTV ratios according to residential submarkets from 2008 to 2016. It shows the variations and disparities across the LTV ratios for each residential sub-market. Properties in Emerging (Zone 3) and Middle-income (Zone 4) tend to attract higher LTV ratios from banks compared to Zone 1 (Upmarket) and Zone 2 (Gated market), accounting for the relatively higher default risk associated with lower-income brackets.

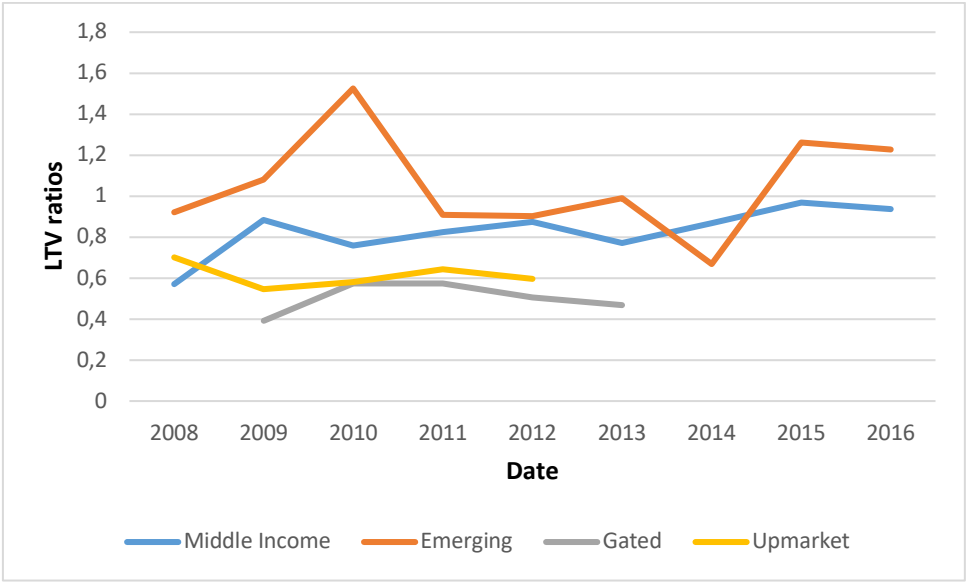


Figure 4: LTV ratio and residential sub-markets

Table 2: Comparison across residential sub-markets

Sub-market	Bedrooms	Plot size	Floor size	Loan value (US$)	LTV ratio
Upmarket (Zone 1)	3.33	1141.31	275.55	145,949	62%
Gated market (Zone 2)	3.04	1153.89	206.85	163,415	61%
Emerging upmarket (Zone 3)	3.16	927.16	444.99	74,669	67%

Middle-income market (Zone 4)	2.65	973.98	160.50	48,312	71%

Table 2 shows a breakdown of four key property sub-markets in Ghana. Loan values and property characteristics are disparate and vary across the property market classifications. Properties in Zone 2, which are predominantly Gated communities, attract the highest average loans from the bank at US$163,415, while Zone 4 (Middle-income properties), at the low end of the residential real estate market in Ghana, attracts the lowest average loans from the bank at US$48,312. However, the highest LTV ratio is observed in the Middle-income markets at 71%, while the lowest LTV ratio is recorded for the Gated communities at 61%, which is expected to account for the associated default risk. In terms of property characteristics, the Emerging upmarket has the highest average number of bedrooms per property at 3.16, as well as floor area at 444.99, while the highest average plot size is observed in Gated communities at 1,153.89, reflecting the bourgeois status of the borrowers (mortgagors). This can be likened to the sense of high self-esteem, self-efficacy, and pride in Mexican residents who construct their own homes as compared to those in state-provided turnkey houses (see Elizondo, 2024).

Table 3: Correlations[8]

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Log floor size	1								
(2) Log loan amount	0.6788***	1							
(3) Log plot size	0.6280***	0.5088***	1						
(4) LTV ratio	-0.2287***	-0.0005	-0.1548***	1					
(5) No. of bedrooms	0.6893***	0.5284***	0.4535***	-0.1969***	1				
(6) Upmarket	0.2552***	0.3902***	0.1383***	-0.1405***	0.2140***	1			
(7) Gated	0.0722*	0.2738***	0.1426***	-0.0180	0.0300	-0.0547	1		
(8) Emerging	0.1254***	0.1569***	0.0420	-0.0426	0.1354***	-0.2397***	-0.1080***	1	
(9) Middle-income	-0.2992***	-0.4749***	-0.1696***	0.1333***	-0.2698***	-0.3824***	-0.1723***	-0.7552***	1

[8] Note that in this correlation involving dummy variables (in this case Zones), any statistical tool works by taking the actual values corresponding to 1 and 0 for those corresponding to 0.

Table 3 presents the correlation matrix for all variables in this study. Except for LTV ratio-loan, Emerging-plot size, LTV ratio-Gated, LTV ratio-Emerging, and number of bedrooms-Gated pairs, all other pairs of correlations are significant at all conventional levels of significance. The insignificant correlation pairs pose an empirical concern for this study. Nonetheless, we base our analysis on the theoretical premise of the hedonic pricing model to examine these in the regression models. For the rest, there is a mix of both positive and negative correlations of various magnitudes. For instance, the Middle-income market has an inverse relationship with plot size, floor size, number of bedrooms, and loan amount, unlike the Emerging market. This confirms the difference in the market, also established by the negative correlations among all of them. Further, there is a significant positive correlation between loan value and the number of bedrooms and the floor area. On the other hand, there is a significant negative correlation between the LTV ratio and the number of bedrooms, plot size, and floor area. These correlations provide preliminary insight into the characteristics of properties that could explain the loan value and the LTV ratio in Ghana.

4.2 Main results

In this subsection, we first present the main results of the study from the two regression models, with loan value (equation 1) and LTV ratio (equation 2) as the response variables for each model. In each of these two models, we create three models (Models 1, 2, and 3 as seen in Tables 4 and 6) with an increasing number of covariates to understand how the different log loan and LTV ratios respond to these sets. Model 1 includes the four zones as regressors, which represents a pure dummy variable regression where Zone 2 (Gated market) is set as the reference zone. In Model 2, we augment Model 1 with the number of bedrooms, the plot size, and the floor area. Finally, in Model 3, we add Detached and Outhouse to Model 2, making it the complete model with all explanators. We note that the R^2 in the models, which supposedly denotes the explanatory power of the model, is small (i.e. between 28% and 35% in Table 5 and between 4% and 8% in Table 6), despite many parameters being significant. Nonetheless, we note the weakness of R^2 in being monotonically increasing with the number of covariates, so we do not give it much importance. Instead, we focus on the significant parameters.

Model 1 (Table 4) reveals that Upmarket, Emerging and Middle-income sub-market housing attract 5.1%, 4.8%, and 4.6% lower loans, respectively, compared to the Gated market. With the addition of number of bedrooms, plot size, and floor, Gated market mortgages are still higher than Upmarket, Emerging, and Middle-income mortgages, but by about 1% less. This corroborates Soyeh et al. (2021), who reveal that housing in Gated communities is transacted at premium prices or rents (and by extension, high mortgage values) compared to those in non-gated communities in Accra. This result also conforms to the findings in Gardner and Mills (1989), which reveal that locations are important when loans are originated. This also connotes social disparities in African cities such as Johannesburg (Hofer et al., 2022), where Gated and access-controlled communities are prevalent, even for government urban developments.

Further, as anticipated, the number of bedrooms (aligned with Shilling et al., 1990) and plot size correspond to higher mortgage values, but a larger floor area tends to reduce house value marginally, as seen in Model 2. In Model 3, the addition of Detached and Outhouse also tends to increase house prices and hence mortgages compared to those without, as expected. Specifically, properties with Detached and Outhouse are priced about 1% more than those without. This result is also confirmed in Leow and Mues (2012) but not in Marinković et al. (2024) for house prices in Serbian cities. We note that all coefficients are significant at all

conventional levels. The predictive ability of the models is 28%, 32%, and 35% for Models 1, 2, and 3, respectively.

Table 4: Regression[9] of loan values and property market segmentation

Log Loan	Model 1	Model 2	Model 3
Zone 1 (Upmarket)	-0.0921**	-0.1010**	-0.1597***
Zone 3 (Emerging)	-0.3879***	-0.3884***	-0.4371***
Zone 4 (Middle-income)	-0.5488***	-0.5339***	-0.5724***
Number of Bedrooms		0.0315***	0.0255***
Log Plot Size		0.0000157***	0.0000123***
Log Floor Area		-0.00000212*	-0.00000244**
Detached			0.0853***
Outhouse			0.0983***
Constant	5.1735***	5.0601***	5.0556***
N	1,443	1,434	1,433
R^2	0.2751	0.3174	0.3478
F-statistic	167.6171 (0.0000)	151.7861 (0.0000)	115.3488 (0.0000)

*Note: The Table reports the regression models on log of loan values and property markets and property characteristics. *, ** and *** denotes significance at the 10%, 5% and 1% levels, respectively. For the F-statistic, p-values are in parentheses.*

Table 5 presents the results using the LTV ratio as the dependent variable, along with the additional three models. The LTV is an important risk measure of the mortgage, and hence, we need to understand the factors that determine it. In Model 1, on average, Emerging and Middle-income sub-markets determine LTV by about 0.5% and 1%, respectively, more than Gated markets. Upmarket plays no role in determining the LTV ratio. Thus, properties within the Emerging upmarket, as well as the Middle-income market, are more likely to attract higher LTV ratios. The findings persist in Models 2-3, confirming lenders' perception of Gated communities as lower-risk, in line with the literature. We again note that the adequacy of the models is not questionable in terms of R^2. Most certainly, we are aware that our model has not controlled for borrower characteristics, which are important variables to consider in terms of the loan value and LTV ratio. However, our model is constrained by limited data.

Table 5: Regression of LTV ratio and property market segmentation

LTV Ratio	Model 1	Model 2	Model 3
Zone 1 (Upmarket)	0.0129	0.0301	0.0256
Zone 3 (Emerging)	0.0612*	0.0627*	0.0565*
Zone 4 (Middle-income)	0.0992***	0.0859***	0.0785**
Number of Bedrooms		-0.0017	-0.00162
Log Plot Size		0.00000987	0.00000838
Log Floor Area		-0.0004***	-0.0004***
Detached			0.0148
Outhouse			-0.0152
Constant	0.6066***	0.6733***	0.6752***
N	630	623	622
R^2	0.0359	0.0788	0.0814

[9] Note that in regression involving dummy variables (in this case Zones), any statistical tool works by taking the actual values corresponding to 1 and 0 for those corresponding to 0.

F-statistic	7.7663894 (0.0000)	6.521336 (0.0000)	5.163049 (0.0000)

*Note: *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively. For the F-statistic, p-values are in parentheses.*

Our study and findings sit within the broader literature on the role of housing segmentation in predicting house prices. Adair et al. (1996) argue that housing market segmentations need not be small, homogenous and well-defined, and that models generated at the macro level could generate an acceptable level of explanation. Bourossa et al. (2003) empirically examine transaction prices from Auckland, New Zealand, and show that housing sub-markets are significant, and specifically, location plays a role in that significance. Segal (2002) examines the multi-family mortgage market; their results support the hypothesis that the mortgage market for multi-family properties is affected by segmentation, specifically that smaller properties with fewer than 50 dwelling units exhibit a number of characteristics that differ from larger properties. Francois and Marius (1996) examine five rental sub-markets in the Canadian region of Quebec; their results show significant differences in implicit prices across the different market segments investigated. The paper argues that resorting to a geographical information system permits the integration of neighbourhood analysis.

For further analysis and robustness tests, we estimate a logistic regression model to determine the probability of default. The rationale is that high LTV ratio loans indicate high risks, for which higher rates are charged (making them more expensive for borrowers) due to the risk of default. In this logistic model, we use all the given regressors to compositely determine the risk of default, as seen in Table 6.

Table 6: Logistic regression of DF and property market segmentation

DF	Estimates
Zone 1 (Upmarket)	-
Zone 3 (Emerging)	-1.034653***
Zone 4 (Middle-income)	-1.033111***
Number of bedrooms	-
Log plot size	-0.000680**
Log floor area	-0.011626***
Detached	-
Outhouse	-
Obs with Dep=0	1399
Obs with Dep=1	66
Total obs.	1465

*Note: *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.*

In Table 6, we present the estimated model with only the significant variables in logistic regression. In logistic regression, the focus is not on the coefficients themselves but on how they combine to determine the probability that a default (DF) belongs to a particular category, also known as log odds (Brooks, 2008). The log odds can be given as:

$$\Pr(DF = 1|X_i) = \frac{1}{1 + e^{-\beta_i}} = \frac{e^{\beta_i}}{1 + e^{\beta_i}} \quad (5)$$

where the variables retain their origination designations. Thus, from the values in Panel B of Table 7, we can evaluate

$$\Pr(DF = 1|\text{Zone 3}, \text{Zone 4}, \text{Plot size}, \text{Floor area}) = \frac{1}{1 + e^{-[-1.034653*\text{Zone 3} - 1.033111*\text{Zone 4} - 0.000680*\text{Plot size} - 0.011626*\text{Floor area}]}} \approx 0.0000$$

There is almost a zero probability that the mortgages will default. This can be evaluated for any specific property for lenders to determine the level of risk involved. This confirms the assertion that many lenders approve mortgages for Gated community houses because they are seen as premium markets and hence with perceived lower risks (Soyeh et al., 2021). The result also corroborates the opinion by Sarfoh et al. (2017) that, despite the claim by the largest mortgage lender in Ghana to extend facilities to workers, their high mortgages are the reserve of 'low-risk' borrowers, hence pricing out their intended customer base. It is also not surprising, given that only 66 out of 1465 properties meet the high-risk threshold of 85% LTV ratio in the dataset. Nonetheless, we should be wary of the Lucas Critique (Smith & Yezer, 2023) on models where they perform well but fail seldomly because mortgage applicants are both able and willing to act strategically.

5. Conclusion

We examine the role residential property attributes play in loan origination (i.e., loan values and LTV ratios). Despite the limitations on transaction data in terms of availability, currency, borrowers' and property characteristics, the literature needs a nuanced understanding of emerging real estate market dynamics like Ghana's. The study reveals that neighbourhood characteristics play a crucial role in the origination of mortgages. Precisely in Ghana, the Emerging, Upmarket and Middle-income property markets attract lower loan values. The number of bedrooms and plot size correspond to higher mortgages, but a bigger floor area tends to reduce house value marginally.

We also find that the probability of default is negligible in the Ghanaian market, as judged by the LTV ratio. As a fledgling mortgage and real estate market in Ghana, transaction data is mostly for new properties rather than old ones, where the repeat sales approach could be used to establish property price indices, as in other countries. Thus, control variables such as loan conditions, borrower characteristics, as well as age of property, which can influence the loan amounts and LTV, are missing. These could lead to the models suffering from omitted variable bias. But their unavailability in the market mitigates the problem.

From a policy perspective, the study's findings can be leveraged to inform policymakers and financial institutions in their decision-making regarding access to affordable housing. Policies can be formulated not only to address the provision of affordable housing but also infrastructure financing to improve the quality of neighbourhoods in cities and towns across the country. These actions can expand the bracket for beneficiaries of state-provided affordable housing, which has mainly focused on civil servants (Asante et al., 2022). With the availability of data and the expansion of the residential real estate market, further studies can be done to track the differences across major cities in Ghana or across the regional capitals, as in Parnes (2023), to foster more policy action and investment insights.

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Appendix: Residential sub-market or location classification

Market Classification	Neighbourhood Characteristics
Upmarket (Zone 1): Airport Residential, Cantonments, East Legon, Labone, Ridge, Roman Ridge, Switchback Road	Low density buildings; predominantly of detached types; plot sizes of no less than 600 square metres; spacious environment free from intrusion by incompatible land uses; community facilities such as schools, clinics and corner shops adequately provided; roads and concrete drains; public utility services adequately provided; state owns freehold interest in land.
Gated Market (Zone 2): East Airport (Golden gate), East Legon Extension (Trasacco Villas)	Gated community with high density buildings; spacious environment free from intrusion by incompatible land uses, access roads and concrete drains available; and public utility services adequately provided; customary freehold interest in land.
Emerging Upmarket (Zone 3) Abelemkpe, Dzorwulo, East Legon Extension, North Legon, West Legon	Predominantly detached with varied plot sizes; spacious environment, no intrusion by incompatible land uses; adequate community facilities such as schools; clinics and corner shops adequately provided; surfaced roads and concrete drains with basic public utility services; both state and customary freehold interest in land.
Middle-income market (Zone 4): Achimota, Adenta, Baatsona, Dansoman, Dome, Okpoigono, Kaneshie, Teshie/Nungua Estates	Variety of buildings at net site densities of between 15 and 45 units per hectare, a mixture of house types (detached, semi- detached, etc.); small-scale retail development in selected areas; adequate level of infrastructural and social amenities; both state and customary freeholder interest in land.

Source: Ministry of Local Government (1990).

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Exploring the housing pathways by young graduates in attaining residential independence in Accra, Ghana

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Abstract

This study explores the housing pathways and difficulties experienced by young graduates in attaining residential independence in Accra, Ghana. Questionnaires were used to collect data on demographic characteristics and housing situation from 150 young graduates residing in Accra, and 20 young graduates who had completed the questionnaires were interviewed to explore their housing situation and challenges in more detail. Data from the questionnaires were analysed using simple descriptive statistics, and the interview data were analysed using thematic analysis. The study revealed that young graduates in Accra faced significant challenges in their housing journeys, marked by frequent moves, unmet expectations, and limited affordable housing options. While many hoped for a quick shift to independent living, financial constraints, job relocations, and the realities of the housing market often delayed or complicated this process. The findings further indicated that despite being employed, many young graduates struggled with housing independence owing to high rental costs and the demand for substantial upfront payments. Family support enabled a few young graduates to make the required upfront payments, providing a crucial stepping stone toward independent living. The young graduates expressed dissatisfaction with current housing policies, calling for more affordable housing, rent control measures, and urban planning that prioritises their needs. This study provides some valuable insights into the housing experiences and difficulties faced by young adults in a challenging housing market, trying to achieve residential autonomy. The study's findings highlight the need for a review of the urban planning and housing development framework within the urban space, which currently prioritises and oversupplies luxurious houses, to include approaches that mandate inclusion of housing for lower-income earners.

Keywords: *Housing, difficulties, young graduates, Accra, Ghana*

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1. Introduction

Housing remains an unmet need of citizens in various countries globally, as housing shortage is a reality in some developing countries (Obioha, 2021). According to Yaacob et al. (2017), housing not only serves the basic needs of citizens but is also considered one of the essential features of independent living. Housing plays an important role in shaping the independence, financial stability and overall well-being of young graduates in Ghana (Akplehey, 2024). However, studies have noted that young adults face significant hardships or barriers in accessing adequate and affordable housing owing to factors such as limited savings and precarious employment (Yaacob et al., 2017; Ornelas et al., 2024). The transition from student life to the working world is a challenging period for young graduates in Ghana, and finding suitable housing is one of the urgent issues they are confronted with (Akplehey, 2024).

The housing experiences and challenges of young adults and graduates have been reported in various countries (for example, in Malaysia and across Europe) by researchers such as Yaacob et al. (2017), Dewilde (2020), Yaacob and Noor (2023), and Ornelas et al. (2024). In Ghana, limited studies (Akplehey, 2024; Rentchamber Group Limited, 2024; Ehwi et al., 2024) have reported on some challenges new/young graduates face when securing affordable and suitable housing. However, these studies have not focused on young graduates' housing experiences, pathways, expectations, and factors influencing their housing decisions. This paper attempts to fill this gap in knowledge. Specifically, the study aims to identify the housing situation and expectations of young graduates in Accra; examine factors influencing the housing decisions of young graduates and housing difficulties experienced in attaining residential independence in Accra; and explore the future house ownership plans of young Ghanaian graduates and their opinions on government policies towards achieving this.

By doing this, the paper offers a nuanced appraisal of young graduate housing issues for informed policy direction. This paper adds to the research on transitions to housing autonomy (transition out of parental home) (Bertolini and Goglio, 2019). In the view of Akplehey (2024), addressing the housing needs of young graduates in Ghana is important for their successful transition into the professional world. Thus, the findings of this study have policy implications relating to housing for young graduates who are transitioning into adult working life.
This paper continues with a review of the literature on housing pathways for young adults/graduates. Afterwards, an overview of the housing situation in Ghana is presented, followed by the study area as well as the data collection methods. The results and discussion are presented subsequently, and the paper concludes with recommendations on how to address the housing difficulties experienced by young graduates in attaining residential independence in Accra, Ghana.

2. Housing pathways of young adults/graduates

Housing pathway is defined by Clapham (2002; 63) as "patterns of interaction (practices) concerning house and home, over time and space". Housing pathway has also been defined as the varying household forms that individuals experience and the housing routes that they take over time (Clapham 2005; Hamzah and Zyed, 2020). The pathways approach was developed from other concepts, for instance, housing careers and housing histories (Clapham et al., 2014). The housing pathways framework is particularly relevant to describe the variety of possible ways in which young people navigate the housing field (Hochstenbach and Boterman, 2015).

It also considers the impact of both structural and agency factors on housing outcomes. Figure 1 displays the analysis framework of the housing pathways approach (Jin et al., 2023).

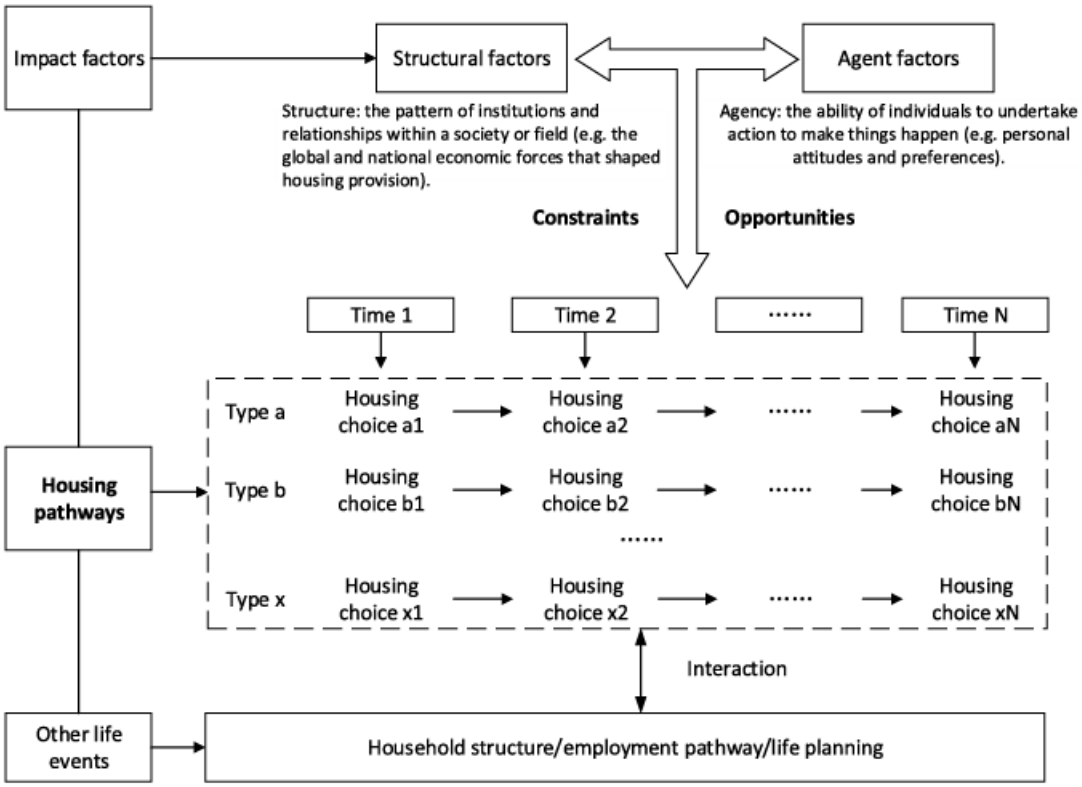

Figure 1: Analysis framework of the housing pathways approach

Source: Adapted from Clapham (2005, 2012) cited by Jin et al. (2023)

A housing pathway is linked to many other areas of life and runs alongside an employment pathway. For instance, changes in household structure due to marriage, childbirth, or divorce influence the housing pathway. Along the housing pathway, individuals and households make choices among the opportunities open to them. Some individuals and households have more opportunities than others, depending on decisions they have already made, as well as many other factors, including their employment situation and income (Clapham, 2005; Jin et al., 2023).

In research on housing pathways and migration plans of young talents (people between 20 and 35 years old with a bachelor's degree or above/who have a national vocational qualification certificate/who are professionals or managers of companies) in Shenzhen, China, Jin et al. (2023) identified four housing pathways. The first two included staying at parents' home (choosing to continue living with parents after entering the labour market) and private renting to owning (first entering the private rental market and will finally acquire homeownership) (Jin et al., 2023). It has been reported that living with parents or family members not only readily provides home comforts to young people/graduates but also presents an opportunity to save money and secure financial assistance from parents to purchase a house. Parents also get the accompaniment and care of their children (Hamzah and Zyed, 2020; Jin et al., 2023). The housing experiences of young adults further show that renting is considered a necessary option due to the inability to purchase a house (Hamzah and Zyed, 2020; Yaacob and Noor, 2023). Research indicated that parental financial support significantly helps young adults/graduates buy a house by boosting their probability of homeownership (Jin et al., 2023). According to

Druta et al. (2019), for some young adults, financial and practical assistance from parents was necessary to live independently, while for others, it made moving out of the parental home more comfortable.

Other housing pathways identified by Jin et al. (2023) among young talents in Shenzhen, China, were talented renting (where young talents enter talented rental housing/company-provided rental housing directly or after experiencing a period of private rental housing) and progressive private renting, frequently moving within the private rental sector. With the progressive private renting housing pathway, the housing quality becomes better after each move to a new dwelling or stays the same. Young talents on the progressive private renting pathway were found to move more frequently than those on other pathways. The major reasons for active moves were changes in the workplace and the desire to improve living conditions. Key reasons for forced moves were the landlord selling or redecorating the house and arbitrary rent increases (Jin et al., 2023).

The staying at parents' home housing pathway is similar to the stay at home to own housing pathway identified among young people in the UK by Clapham et al. (2014) (Jin et al., 2023). The private renting to owning housing pathway is in line with the traditional linear housing pathway of rent to own, as found in research by Hamzah and Zyed (2020) (Jin et al., 2023). The progressive private renting housing pathway appears similar to the progressive chaotic housing pathway outlined by Hochstenbach and Boterman (2015) (Jin et al., 2023). However, the private renting to talented renters housing pathway may be more specific for Shenzhen, China, as it has gradually emerged since the enactment of the Talent Housing Project in 2010 (Jin et al., 2023).

Furthermore, research has reported on young adults sharing rented accommodation with friends. For instance, in Germany, Lennartz and Helbrecht (2018) found that shared living in rental housing, both with friends and housemates who were strangers before the sharing situation, was common among younger adults while studying and in the first years after entering the labour market. Heath and Calvert (2011) similarly stated that friends play an important role in the housing pathways of single young adults, with many experiencing shared living arrangements as part of their transition from the family home.

The foregoing studies on housing notwithstanding, there is little or no information about housing pathways of young graduates in an emerging nation like Ghana. This study addresses this gap by examining the housing situation and expectations of young graduates in Accra, as well as the factors influencing their housing decisions and the difficulties they face in achieving residential independence. The next section describes the housing situation in Ghana.

3. Housing circumstances in Ghana

Housing supply in Ghana is carried out through three major channels. These include housing offered by the government, housing provided by private real estate developers, and self-building by individuals and households (Acheampong, 2019). The increasing population in Ghana has continued to widen the housing deficit, which is estimated at 1.8 million housing units (CAHF, 2023; UN-Habitat, 2024). Additionally, over half (about 57%) of Ghana's population lives in urban areas, with the highest percentage in the Greater Accra Region (Ghana Statistical Service, 2021b). The UN-Habitat (2024) stated that the Ghanaian government has intervened in the housing situation in the nation to offer affordable housing, particularly for public sector workers. According to the Ghana Statistical Service (2021a), the public sector (government) engages about 10% of the employed population 15 years and older, and about

13% of the employed populationise in the private formal sector, while a majority (77%) are employed in the private informal sector.

Private real estate developers in Ghana build high-quality housing, frequently in gated communities; however, at very high prices relative to incomes in Ghana (UN-Habitat, 2011; Acheampong, 2019). The Ghanaian economy is characterised by low wages and salaries (Ehwi et al., 2024). It was reported that houses built by private developers are often overpriced, making them unaffordable to low- and middle-income families. Housing provided by these developers is accessible by 1% of households in the urban areas (UN-Habitat, 2024). Ehwi (2021) reported that the prices of housing (two-, three-, and four-bedroom detached single-storey) in one gated housing community in Accra by private developers range from $220,000 to $450,000, and in another from $36,000 to $313,000. Soyeh et al. (2020) also found that property owners charge 48% more for rent in gated properties than in non-gated houses.

With most (80%) public sector workers in Ghana earning below GH¢3,000 (US$196[1]) monthly, most Ghanaians cannot afford to borrow at present interest rates (Ghana Statistical Service, 2023; CAHF, 2024). According to the UN-Habitat (2024), mortgages are given at 30% per annum, making them only accessible to those with high incomes. Consequently, approximately 90% of housing is supplied incrementally, with Ghanaians self-building using their personal and family savings as and when available. Construction can take between five and 15 years to complete, resulting in a lag between housing supply and demand (Bank of Ghana, 2007; UN-Habitat, 2011; CAHF, 2023; 2024).

Renting is the most common type of tenure in urban areas, with 46% of households in rented housing (UN-Habitat, 2011; Ghana Statistical Service, 2022). Landlords have been accused of taking advantage of tenants by charging high and exorbitant rents (UN-Habitat, 2024). In addition, landlords usually demand two or three years of rent in advance from new and sitting tenants in place of monthly rent. This is in contrast to the provisions of rent law in Ghana, which states that property owners can charge rent in advance for not more than six months (Tipple et al., 1999; UN-Habitat, 2011; Asante et al., 2018). Researchers have reported that many people have to depend on help from family and friends to pay advance rent, and besides this, paying a monthly rent may also be very hard for low-income earners with irregular incomes (Gough and Yankson, 2011). However, Asante et al. (2022) found that a majority of employed graduate tenants in Ghana used their savings to raise funds for all or part payment of their advance rent. But some new, unemployed or newly employed graduates with very little personal savings depended on family and friends to raise part or all of the advance rent (Asante et al., 2022). Ehwi et al. (2024) also discovered that reasons why tenants find the payment of advance rent difficult include extended advance rent periods, unemployment, households with only one working adult, insufficient savings, low salaries and delayed salary payments. Generally, young adults leaving the parental home is an expectation of parents, and this is considered an obvious step on the road to adulthood (Druta et al., 2019). This paper, therefore, offers new and additional insights into young graduates' housing experiences and difficulties in achieving residential independence in Accra, as well as their opinions on government policies that could support them in attaining suitable housing.

4. Study area, materials and methods

This section provides discussions on the study area and methods of data collection.

[1] 1 US Dollar is equivalent to 15.27 Ghanaian cedis as at 1st July 2024 (CAHF, 2024).

4.1 Study Area

The study was conducted in the city of Accra owing to its significance as a hub for young graduates seeking employment and housing. Accra is the capital and largest city in Ghana as well as the regional capital of Ghana's Greater Accra Region (Ghana Statistical Service, 2014; Gaisie et al., 2019). With a population of more than two million, the city is located along the Atlantic coast. Figure 2 is a map of the Greater Accra Region (Gaisie et al., 2019; WorldAtlas.com, 2025).

Furthermore, Accra is the economic hub of the Greater Accra Region and Ghana. The city hosts a number of manufacturing industries, oil and gas companies, financial institutions, telecommunications, tourism, education and health institutions, as well as other important establishments such as international embassies. These institutions provide job opportunities to residents of Accra, and their presence continues to attract people from all parts of Ghana and beyond to transact various businesses (Ghana Statistical Service, 2014; Gaisie et al., 2019).

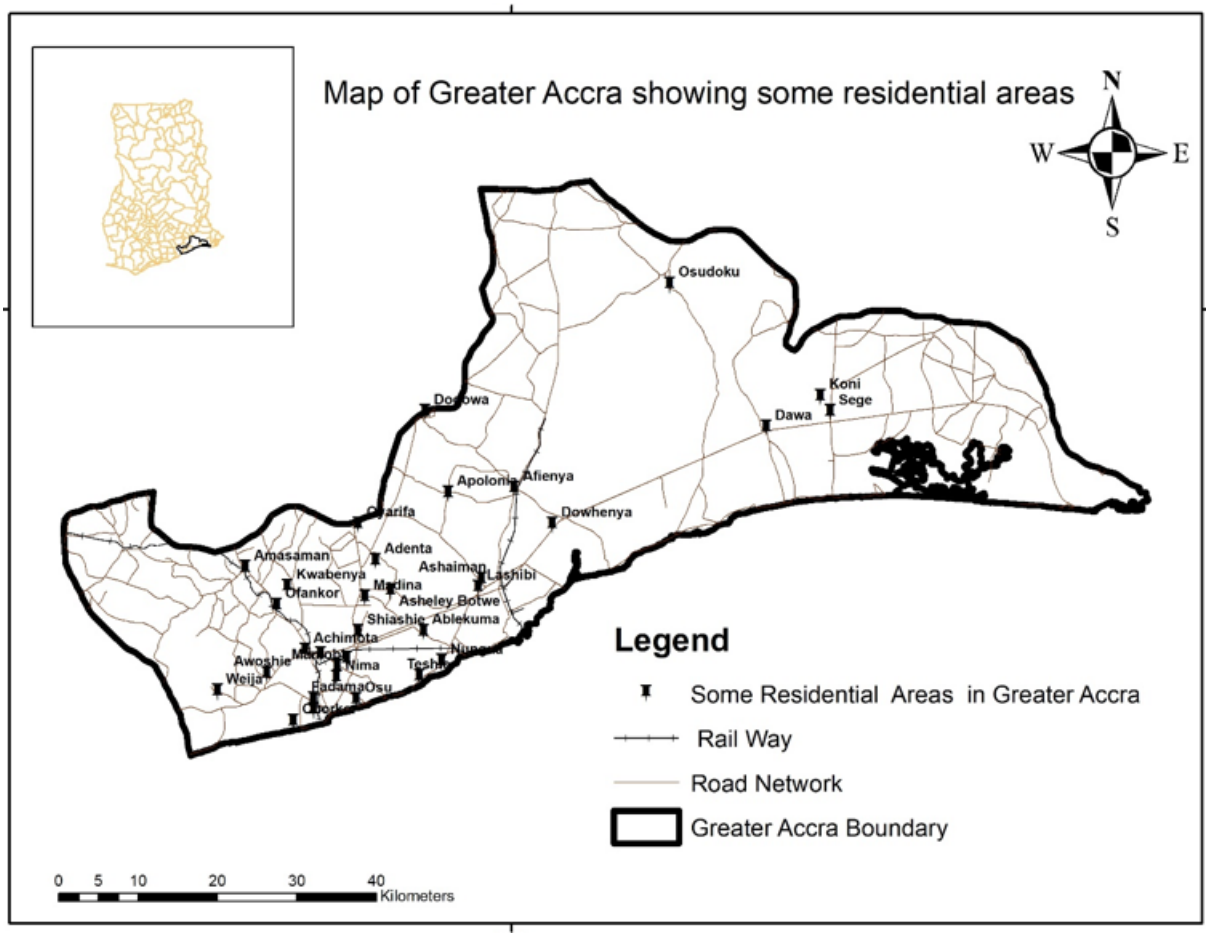

Figure 2: Map of Greater Accra showing some residential areas

Source: Authors' construct

4.2 Materials and Methods

A mixed-methods approach was adopted for this study. Mixed methods research integrates both qualitative and quantitative approaches to offer a comprehensive understanding of complex phenomena. By combining the strengths of both methodologies, researchers can triangulate

data, validate results, and obtain deeper insights into research questions (Ahmed et al., 2024). Regnault et al. (2018) also stated that mixed methods research allows a research question to be studied from different perspectives. For instance, researchers can combine the rich, subjective insights on complex realities from qualitative inquiry with the standardised, generalizable data generated through quantitative research. Data for this study were collected between August and September 2024. Participants of this study consisted of young graduates who had completed their tertiary education within the last five years and were residing in Accra at the time of the research. They were chosen because they were transitioning from education to employment and independent living. Their housing experiences are therefore reflective of the opportunities and challenges faced by young professionals in urban Ghana.

A total of 150 young graduates in Accra participated in the survey. A questionnaire was designed to collect data on the participants' demographic information, their current housing situation in Accra, the sources they used when searching for housing, whether they had benefited from government housing interventions or support programmes, and their plans for home ownership. The participants were also asked to suggest plans that can enhance housing interventions for young graduates in Accra. The survey was conducted both online through Google Forms and in person to ensure a wider reach and higher response rate. A total of 140 young graduates completed the online questionnaire, and 10 young graduates who had not completed the online questionnaire completed the questionnaire in person. The questionnaire was pilot tested with a small group of young graduates to ensure clarity and relevance. Feedback from the pilot test was used to refine the questions and improve the overall reliability of the instrument.

In-depth interviews were also conducted with 20 young graduates who completed the questionnaires to explore their housing situation and challenges in more detail. The interviews were semi-structured and centred on factors that influenced young graduates' current housing choices, perceptions about the housing options available to them in Accra, and challenges encountered in securing housing in Accra. The opinions about government policies that could support young graduates in finding suitable housing in the city were also explored during the interviews. The interviews were conducted in person at workplaces and the church and were recorded with the participants' consent. They lasted between 10 and 15 minutes. After the sixteenth (16^{th}) interview, no new significant theme or insights emerged, indicating that data saturation had been achieved. However, interviews were continued up to the twentieth (20^{th}) participant, ensuring a deeper understanding and richer interpretation of existing themes. It was reported that saturation can be reached at relatively small sample sizes in interviews, with as few as 9-17 interviews (Hennink and Kaiser, 2022).

Purposive and snowball sampling techniques were employed to select participants for the study. Purposive sampling was used to select initial participants who met specific criteria (having graduated within the last five years and currently residing in Accra) to complete questionnaires. The reason for purposive sampling is the better matching of the sample to the aims and objectives of the study, therefore improving the rigour of the research and trustworthiness of the data and findings (Campbell et al., 2020). Snowball sampling was used to identify additional participants. Initial respondents were asked to refer other young graduates in their network who fit the study criteria. This technique helped to broaden the participant base and gather more diverse perspectives. The advantage of snowball sampling is that it can be used to reach difficult-to-reach or hidden populations through personal referrals, making it easier to recruit a larger and more varied sample (Kennedy-Shaffer et al., 2021; Ahmed, 2024).

For the semi-structured interviews, convenience sampling was used to select 20 participants who had completed the questionnaires. Convenience sampling enables researchers to select

participants who are available and willing to participate (Ahmed, 2024). The data from the questionnaires were analysed using simple descriptive statistics, such as frequencies and percentages, which are presented in a table (Ehwi et al., 2024), while the interview data were transcribed and analysed thematically. Thematic analysis involved reading the interview data multiple times and coding the data to identify recurring themes and patterns related to the housing experiences of young graduates in Accra. Informed consent was obtained from each participant before they participated in the survey or interviews. Personal identifiers were removed from the data to ensure anonymity, and the information was securely stored. Participation was entirely voluntary, and participants were informed of their right to withdraw from the study at any time without any consequences.

5. Results and findings

This section presents the findings of the study along with a discussion of the findings.

5.1 Selected demographic characteristics of the respondents

In terms of the demographic data of the respondents, more than half (52%) of the young graduates in this study were males, and the highest number (45%) were within the age range of 26-30 years (see Table 1). In terms of educational attainment, the majority (90%) held first and second degrees and primarily found employment in Accra, Ghana's private formal sector. Asante et al. (2022) similarly noted in their study that most of the young graduates were employed in the private formal sector.

Even though most of the young graduates (85%) in this study were employed, a few were unemployed (see Table 1). It has been reported that increasing graduate unemployment is an issue in Ghana, as some graduates from tertiary institutions are unable to find jobs (Zakaria & Alhassan, 2019). As of the third quarter of 2023, the youth unemployment rate for persons 15-35 years in Ghana was 21.7% (Ghana Statistical Service, 2024). In-depth examination of the reasons for graduate unemployment was outside the scope of this paper. However, factors such as fewer job opportunities relative to the large number of graduates in Ghana, graduates' lack of practical skills, and a mismatch between school supply and demand in the labour market have been reported as reasons for graduate unemployment in Ghana (Biney, 2015; Foster, 2022).

Table 1: Demographic and housing information of respondents

Category	Frequency (n=150)	Percentage
Gender		
Male	78	52%
Female	72	48%
Age range		
20-25 years	30	20%
26-30 years	68	45%
31-35 years	45	30%
36 years and above	7	5%
Educational level		
First/Bachelor's degree	97	65%
Second/Master's degree	37	25%
Professional Certification	16	10%
Current employment status		
Employed/self-employed	128	85%
Unemployed	22	15%
The sector of employment for those employed		
Government	47	31%
Private	69	46%
Self-employed	34	23%
Current housing situation		
Rented apartments	75	50%
Family-owned housing	37	25%
Self-built house	22	15%
Other arrangements	16	10%

Source: Authors' field survey

5.2 Housing situation of the respondents

According to the results as presented in Table 1, most of the participants (50%) lived in rented apartments, while others lived in family-owned properties and self-built houses. A possible explanation for many living in rented apartments might be that detached houses generally have higher rents than apartments or single rooms in shared compounds[2] in Ghana (UN-Habitat, 2024). Limited funds were found to be a significant barrier for young graduates in the study area. The housing situation of the respondents in this study reflects the findings by Asante et al. (2022), who similarly noted that most young graduates lived in flats or apartments. It was further found that the majority of the young graduates in this study found their housing through

[2] A compound house is a house where many different households stay in different rooms in the same unit and use common facilities such as bathrooms and kitchen (Adu-Gyamfi, 2018).

family or friends. A few graduates shared housing arrangements with peers. For instance, one respondent stated that:

> *"I couldn't afford to rent alone, so I moved in with a friend, and we split the rent"* (Respondent 13, Accra, 2024).

In addition, it was discovered that a majority (80%) of the young graduates in this study had not benefited from various government housing intervention programmes. A possible explanation for this is that the Ghanaian government housing intervention programmes mainly focus on public sector workers (UN-Habitat, 2024), while a majority of young graduates in this study were employed in the private formal sector or self-employed in Accra.

5.3 Housing expectations and experiences: navigating post-graduation realities

Many respondents in this study described their housing journey since graduation as a series of transitions, often starting with living with family before moving into independent housing. One graduate noted:

"*I initially stayed with my parents for about a year after graduation while I saved up for a place of my own" (Respondent 4, Accra, 2024).*

And another stated that:

"I lived with my parents for two years after graduation because I couldn't afford to rent an apartment right away" (Respondent 10, Accra, 2024).

Besides this, another respondent stated that there were frequent changes in the housing situation owing to job relocations and changes in the financial situation. He said:

"I had to move from where I was staying because I got a job in another place, which is very far, and transportation would have been a problem. Again, the rent I was paying at my initial place was high, and so I already had plans to move" (Respondent 2, Accra, 2024).

Moreover, it was found that young graduates generally had high expectations regarding their post-graduation housing, hoping to quickly move into comfortable, independent living arrangements. However, these expectations were often tempered by the realities of the housing market in Accra. One respondent noted:

> *"I expected to find a nice apartment close to work, but the rents were way higher than I anticipated" (Respondent 17, Accra, 2024).*

These findings showed that young graduates in Accra faced significant challenges in their housing journeys, marked by frequent transitions, unmet expectations, and limited affordable housing options. While many hoped for a quick shift to independent living, financial constraints, job relocations, and the realities of the housing market often delayed or complicated this process. Thus, affordability and quality emerged as major concerns.

5.4 Factors influencing the housing decisions of young graduates and the housing difficulties experienced

This section presents findings on factors influencing the housing decisions of young graduates and housing difficulties experienced by young graduates in Accra.

5.4.1 Salary levels, rent, upfront payments, economic conditions and proximity to work

The effect of salary levels on housing decisions was evident throughout the interviews. Graduates with higher incomes had the privilege of choosing better-quality housing in desirable

locations, while those with lower incomes were forced to make sacrifices. These compromises often meant living in smaller apartments, settling for less desirable neighbourhoods or enduring longer commutes to work. As one participant stated:

> *"My income pretty much dictates where I can live. I had to settle for a smaller apartment farther from work because it was all I could afford" (Respondent 19, Accra, 2024).*

This finding suggests that for many graduates, income level limits their housing options, curbing their independence and mobility.

The financial burden of securing housing in Accra was also a recurring theme in the interviews. Graduates spoke of the high rents and the considerable upfront payments often required by landlords, including security deposits and advance rent. These payments could amount to as much as two years of rent, placing a heavy strain on young people who were just starting their careers. In the words of a respondent:

> *"It was difficult coming up with the two years' rent advance that landlords usually demand" (Respondent 1, Accra, 2024).*

This highlights the immediate financial hurdles graduates must overcome before moving into a new house. Besides rent, the cost of furnishing a house was also a significant challenge faced by these graduates.

This study also found that economic conditions in Accra, including job market instability and rising inflation, added another layer of difficulty to the housing decisions of young graduates. The unstable job market, combined with the ever-increasing cost of living, made it even harder for many to secure and maintain affordable housing. One respondent explained that:

> *"The job market is tough, and with the rising inflation, it is becoming even harder to afford rent" (Respondent 18, Accra, 2024).*

Graduates expressed concern about their financial futures, with many feeling that economic uncertainty limited their ability to make long-term housing plans. This financial insecurity often delayed their transition to independent living or forced them to settle for housing that was below their expectations.

5.4.2 Cultural expectations and proximity to family

Cultural expectations emerged as a key influence on housing decisions, with respondents feeling pressured to align with societal norms around independent living after graduation. In some Ghanaian cultures, there is an implicit expectation that young adults will move out and establish themselves independently shortly after completing their education. However, the realities of the housing market and economic challenges often made this transition difficult. One graduate respondent explained that:

> *"In my culture, there is an expectation to start living on your own after you finish school, but it's not always easy" (Respondent 20, Accra).*

This finding reflects the tension between cultural ideals and financial realities, as many graduates found it challenging to balance the desire for independence with the cost of securing housing. This study further found that, for many graduates in this study, family played a central role in shaping their housing decisions, particularly in relation to location. The desire to maintain close relationships with family members, especially parents, often influenced where graduates chose to live. Some respondents expressed a preference to live near their families,

not only for emotional and social support but also to assist when needed. As one participant put it:

> *"I chose to live close to my parents because family is very important to me, and I wanted to be nearby in case they needed anything" (Respondent 13, Accra, 2024).*

This highlights how strong family bonds and cultural expectations about living independently influence housing decisions.

5.4.3 Financial assistance

Amid the financial challenges in the country, it was discovered that a few graduates were fortunate enough to receive financial assistance from their families, which proved to be a critical factor in their ability to secure housing. In these cases, family support enabled graduates to make the necessary upfront payments, providing a crucial stepping stone toward independent living. As one graduate opined:

> *"My parents helped me with the first rent payment; otherwise, I wouldn't have been able to move out on my own" (Respondent 4, Accra, 2024).*

This financial support not only eased their financial pressure but also allowed some graduates to move into better quality housing than they would have been able to afford on their own. The findings further showed that generally these graduates viewed the housing options available to them as limited, particularly in terms of affordability and quality. For instance, a respondent commented that:

> *"Affordable housing for young people is really hard to find in Accra, and the quality is often not great" (Respondent 18, Accra, 2024).*

5.5 Future house ownership intentions

The study also explored the intention of young graduates to own a home in the next five years in the questionnaire. The results showed that among the respondents, 40% were unsure, 35% were considering it, and 25% were not considering it. This indicates that it may take longer for young graduates to participate in the housing market as prospective homeowners. Generally, it is challenging but achievable for Ghanaians to own a house, often taking years due to high costs, the build-as-you-earn culture and housing shortages, especially for affordable options (Asante et al., 2018; UN-Habitat, 2024).

5.6 Policy and urban planning perspectives: addressing the housing needs of young graduates

Many respondents highlighted the pressing need for government policies that directly address the housing challenges faced by young graduates. These challenges included high rents, limited affordable housing options, and the lack of financial support for first-time renters. Graduates called for policies such as subsidised housing schemes and rent control measures to help mitigate the high costs associated with securing independent housing. For instance, a respondent noted that:

> *"The government needs to introduce policies that make housing more affordable for young people, maybe through subsidies or rent control" (Respondent 5, Accra, 2024).*

Some respondents also emphasised that current policies were inadequate in creating accessible housing solutions, particularly for those on lower incomes. This has led to an increasing reliance on private rental markets, where prices are often dictated by market forces rather than regulated by government oversight. The lack of comprehensive housing policies that cater for the needs of young graduates was repeatedly identified as an area that requires immediate attention.

In addition to the need for supportive policies, graduates also critiqued the state of urban planning in Accra, noting that it often prioritises high-end developments over affordable housing for young professionals. There was a widespread perception that urban planning efforts cater more for affluent individuals or expatriates, leaving fewer options for young Ghanaians. One participant remarked that:

> *"Urban planning in Accra seems to focus more on high-end developments rather than affordable housing for young graduates" (Respondent 15, Accra).*

This finding reflects the broader frustration with the disparity between luxury housing projects and the lack of affordable housing options, which further complicates the housing search for young people entering the workforce.

Graduates expressed a desire for urban planners to consider the unique needs of young graduates, many of whom are navigating financial constraints and fluctuating job markets. They suggested that inclusive urban planning should involve the creation of mixed-income housing developments, which would offer a variety of housing options at different price points, making it easier for young professionals to find homes that suit their budgets. Respondents also called for better infrastructure development, particularly in areas where affordable housing is more readily available but access to amenities, transportation, and job opportunities is limited.

6. Discussion

The findings from this study showed that most of the young graduates were in the age range of 26-30 years, with a significant percentage employed. The findings also showed that rented apartments were popular among these young Ghanaian graduates, which affirmed the findings of Asante et al. (2022). Moreover, the study highlights the significant role of rental housing in the lives of young graduates, with a substantial percentage of respondents residing in rented apartments. This is consistent with findings from studies by Hoolachan et al. (2016) and Yaacob and Noor (2023), which indicate that many young adults in urban areas rely on rental housing, particularly in contexts where homeownership is increasingly unaffordable (Howard et al., 2023). A few of the young graduates were found to be living with their peers, and shared housing arrangements among young adults were reported by researchers such as Lennartz and Helbrecht (2018).

The effect of socioeconomic factors, particularly salary levels, on housing decisions was a key theme in the findings. The study found that graduates with higher salaries were able to afford better-quality housing, while those with lower salaries had to compromise on factors such as location, size, and amenities. This result seems consistent with other studies, which found that salary is a key determinant of housing choices (Islam and Biswas, 2019). The housing challenges faced by respondents in attaining residential independence, including high rents, the need for substantial upfront payments, and limited affordable housing options, support evidence from previous observations, for example, Akplehey (2024), Rentchamber Group Limited (2024), and Ehwi et al. (2024).

The study also found that some graduates received financial assistance from their families to secure housing, highlighting the role of intergenerational support in attaining residential independence. This finding is consistent with research by Lennartz and Helbrecht (2018) and Asante et al. (2022), who discovered that family support is increasingly important in enabling young adults to access housing, especially in expensive urban markets. Earlier studies have also stated that it is common for parents and older relatives to assist financially in enabling young adults to live independently (Heath and Calvert, 2011). However, the reliance on family assistance may also reflect broader structural challenges in the housing market, where young graduates struggle to attain housing independence without external support.

Cultural and social factors also played a significant role in shaping the housing decisions of young graduates in Accra. The study found that cultural expectations regarding independent living and the importance of maintaining close family ties influenced respondents' housing choices. This is in line with the literature on the existence of parents' expectations of their children leaving the parental home and the influence of proximity to family on residential choices (Limbumba, 2010; Druta et al., 2019). These findings further suggest that the expectation to live independently after graduation is strong, but this expectation is often at odds with the economic realities faced by young graduates.

The study's findings on the intentions of young graduates to own a house in the next five years indicated that a majority were unsure or were not considering it. This suggests that house ownership may be difficult to achieve or unlikely to happen for these young graduates. Similarly, in a port city in southern England, Heath and Calvert (2011) discovered that most young adults (mainly graduates) felt that buying their personal house was a very distant hope.

The study's findings on the perceptions of government policies and urban planning efforts reveal a critical gap between policy intentions and the lived experiences of young graduates. Many respondents expressed dissatisfaction with current urban planning practices, which they perceived as favouring high-end developments over affordable housing solutions. These findings are in agreement with Acheampong (2019), who reported that private developers have targeted the high end of the housing market, constructing housing that only upper-middle-income and high-income households residing in Ghana and overseas can afford (Acheampong, 2019). It has also been reported that there is an oversupply of luxury housing targeted at high-income earners and a persistent shortage of low-income housing in Ghana (CAHF, 2024).

The call for more supportive government policies, including subsidised housing and better regulation of rental prices, reflects a broader demand for housing policies that are responsive to the needs of young graduates. These results suggest that rental assistance programmes are seen as helpful policy interventions for improving housing access for young graduates in Ghana (Ornelas et al. 2024). Researchers have similarly discovered that most young people on Madeira Island, a Portuguese island territory, considered rental assistance programmes the most immediate and impactful interventions for improving housing access for youth (Ornelas et al., 2024).

7. Conclusion

The study explored the housing experiences of young graduates, analysing their housing decisions and challenges faced in navigating the constrained housing market in Accra. The findings showed that most of these young graduates were within the age range of 26-30 years, with a significant proportion being employed. However, despite their educational achievements, many continued to face challenges in achieving residential independence. The

study found that a majority of the respondents were living in rental apartments, while others lived in self-built houses, family-owned properties or shared housing arrangements with peers.

In terms of housing experiences, the study highlighted the prevalence of frequent residential moves among young graduates, driven primarily by the search for better housing quality, proximity to workplaces, and affordability. However, the prospect of homeownership within the near future appeared uncertain for many respondents, with a significant portion expressing uncertainty about their ability to purchase a home within the next five years. Many young graduates described their housing journeys as marked by initial high expectations that were later tempered by the realities of Accra's housing market. Financial constraints, particularly high rents and the demand for substantial upfront payments, emerged as major barriers to achieving independent living. The influence of cultural and social factors was also evident, with some graduates feeling pressured to live independently due to cultural expectations, while others preferred to stay close to family for support. Moreover, there was a clear call for more supportive policies, such as subsidised housing schemes and better regulation of rental prices, to make housing more affordable for young graduates. Additionally, respondents emphasised the need for urban planning that prioritises affordable housing solutions over high-end developments, which are often inaccessible to young graduates.

Overall, the findings from this study highlight the complex and often challenging housing experiences faced by young graduates in Accra. The study also contributes to a deeper understanding of the housing experiences and difficulties faced by young graduates in Ghana and highlights the critical need for comprehensive and effective housing policies to assist this group. Addressing these housing issues is important to the well-being and success of young adults and for the broader socio-economic stability and development of the country (Ornelas et al., 2024). The study underscores the need for housing policy interventions that specifically address the housing plight of young graduates. There is also the need for a review of the urban planning and housing development framework within the urban space, which currently prioritises and oversupplies luxurious houses, to include approaches that mandate inclusion of housing for lower-income earners. Ongoing redevelopment of prime lands owned by the state in city centres across Ghana provides an entry point for the government to leverage on to get developers to supply houses not only for the upper-income group, but also tailor-made affordable housing units dedicated to low-income earners and young graduates. While this study provides meaningful insights, it was restricted to one city in Ghana, which limits the ability to generalise the findings of the study to a wider context.

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